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Data Article

Supporting dataset for elemental traits of plant-invertebrate food web components of oilseed rape fields

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ABSTRACT

This dataset is provided in support of the paper "Edge effect imprint on elemental traits of plant-invertebrate food web components of oilseed rape fields" (Orłowski et al., 2019). Supplementary data are given on the following: (1) the full taxonomic list of invertebrates (n = 12 916) classified into food guilds and functional groups, which were sampled in 34 oilseed rape fields in SW Poland in spring 2015; (2) concentrations of 12 chemical elements measured in invertebrates; (3) the relationships between abundance and percentage (%) in the community of major invertebrate groups, and habitat variables; (4) the statistical tests comparing the concentrations of chemical elements between the different groupings of organisms; (5) the relationships between the elemental traits of oilseed rape plant samples and major functional

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invertebrate groupings or main taxonomic insect groups, and the habitat variables of oilseed rape fields.

Specifications Table

Subject area	Ecology, Biological Sciences, Biogeochemistry, Agroecology
More specific subject area	Biogeochemistry of invertebrates
Type of data	Tables, figures
How data was acquired	Through field work and laboratory work
Data format	Raw, filtered and analysed
Experimental factors	Investigation of chemical composition of insects and plant tissues, and variability in land-cover.
Experimental features	Quantification of the abundance of invertebrates and measurements of the elemental composition (K, Na, Ca, Mg, Cu, Zn, Fe, Mn, As, Cd, Co and Pb) of 15 different organisms within the plant-invertebrate food web: plant − oilseed rape pests/herbivores − pollinators = wild bees − saprovores − predators − parasitoids. These were then related to the individual field edge habitat features (including typically anthropogenic ones like dirt and tarred roads) measured within a 100 m radius around the invertebrate sampling sites.
Data source location	The dataset presented in this data paper were gathered in spring 2015 on 35 winter oilseed rape fields (average area 22.46 ha; range 0.82−159.22 ha) in the agricultural landscape around the village of Turew, Wielkopolska province, south-west Poland.
Data accessibility	The data are given in this article
Related research article	G. Orłowski, J. Karg, P. Kamiński, J. Baszyński, M. Szady-Grad, K. Ziomek, J. Klawe, Edge effect imprint on elemental traits of plant-invertebrate food web components of oilseed rape fields. Sci. Tot. Environ. 687 (2019) 1285−1294. https://doi.org/10.1016/j.scitotenv.2019.06.022

Value of the data

- The data on elemental traits of organisms relate to the individual field edge habitat features (including typically anthropogenic ones like dirt and tarred roads) measured within a 100 m radius around the invertebrate sampling sites.
- The data in this article demonstrate that the elemental traits of the plant-invertebrate food web components in oilseed rape crops varied owing to the habitat specificity determined at the relatively small spatial scale of an individual field, and that the elemental traits of these organisms differed from both an inter- and an intra-guild perspective.
- These data may be useful for explaining the sources of variation in both the quality of agricultural products (including food for human consumption) and the dietary flow of essential macronutrients and non-essential trace elements within plant-invertebrate food webs in agroecosystems.

1. Data

The data presented here (Figs. 1 and 2; Tables 1–7) constitute the basis for the article by Orłowski et al. [1]. The dataset provides detailed information on: (1) the full taxonomic list of invertebrates ($n = 12\,916$) classified into food guilds and functional groups (Annex 1 in Ref [1]; Table 4), which were sampled in 34 oilseed rape fields in SW Poland in spring 2015 (Fig. 1; Tables 1 and 2); (2) concentrations of 12 chemical elements measured in invertebrates (Table 3); (3) the relationships between abundance and percentage (%) in the community of major invertebrate groups, and habitat variables (Table 5); (4) the statistical tests comparing the concentrations of chemical elements between the different groupings of organisms (Table 6); (5) the relationships between the elemental traits of oilseed rape plant samples and major functional invertebrate groupings or main taxonomic insect groups, and the habitat variables of oilseed rape fields (Table 7).

The most numerous of the invertebrates, classified into six functional groups, were herbivores, which made up on average 39.4% (95% CI = 34.9−43.9%) of all the specimens sampled from one field.

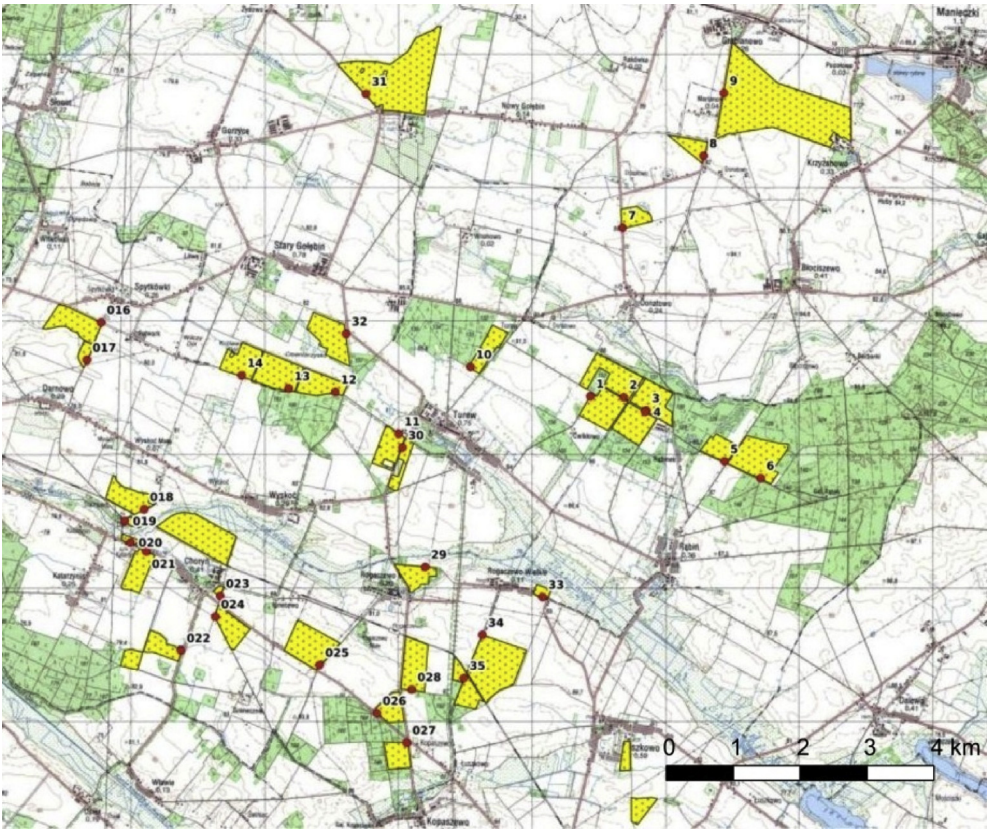

Fig. 1. Distribution of the 34 oilseed rape fields with the exact positions of the Moericke traps (red dots), where invertebrates were sampled in spring 2015.

Next in order of abundance were saprophages, 36.5% (31.7–41.3%); pests of oilseed rape, 13.7% (10.9–16.6%); predators, 5.7% (4.4–7.0%); pollinators (wild bees, primarily representatives of two subfamilies, Andreninae and Halictinae), 3.2% (2.0–4.3%); and parasitoids, 1.5% (1.2–1.8%) (Annex 1 in Ref [1]). 18% fewer invertebrates were sampled on small fields with mosaic-like surroundings compared with small fields with open surroundings (Fig. 1 in Ref [1]).

1.1. Relationships between landscape and habitat variables, and abundance of invertebrates

There was a weak but insignificant relationship between the (*log*-transformed) area of a field and the number of invertebrates sampled there ($r = 0.155$, $P = 0.406$). On average, 6.2% more invertebrates were sampled in the large fields (i.e. area >13 ha; $n = 24$) than in the small ones (i.e. area <8 ha; $n = 10$): 387 (95% C.I. = 334–440) vs. 363 (237–488), respectively. More pronounced differences emerged when the landscape context, i.e. the type of field surroundings, was taken into account. In an open landscape, 12% fewer invertebrates were sampled in the small fields than in the large ones (Fig. 1 in Ref [1]). In a mosaic-like landscape, by contrast, 20% more invertebrates were sampled in the large fields than in the small ones (Fig. 1 in Ref [1]). 18% fewer invertebrates were sampled in small fields with mosaic surroundings than in small fields with open surroundings (Fig. 1 in Ref [1]). None of these differences, however, were statistically significant (Mann-Whitney test, $P \geq 0.201$), presumably because of the small sample size and the confounding influence of edge habitat variability (see below).

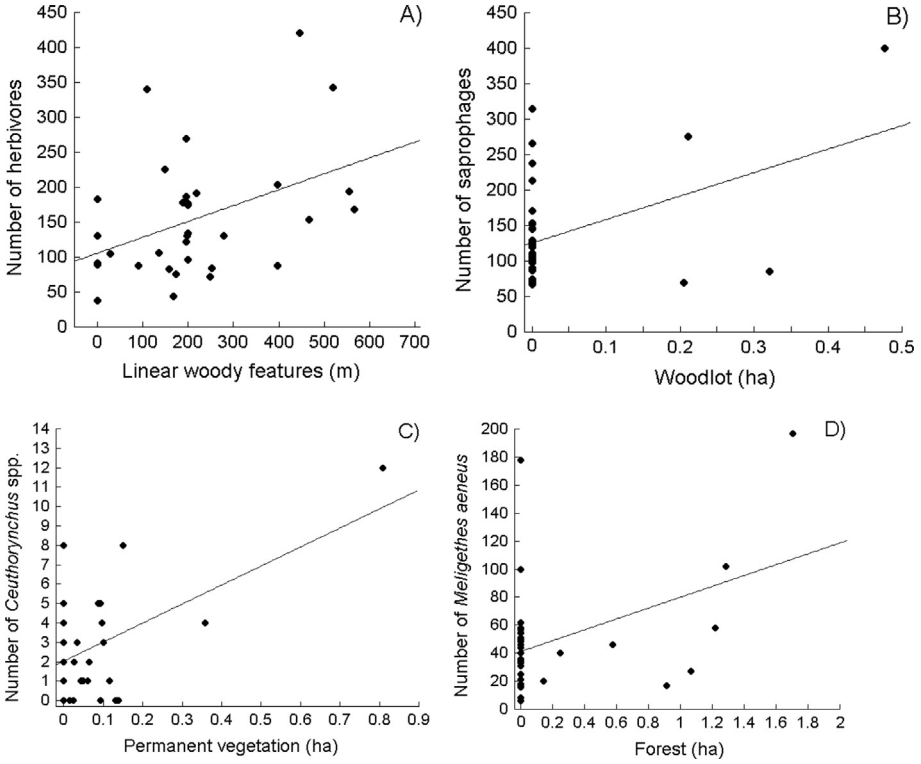

Fig. 2. Examples of statistically significant relationships between the number of major invertebrate/insect groups sampled and the habitat variables of 34 oilseed rape fields; woodlot = wood.

Table 1
Basic descriptive statistics of 10 habitat variables (= landscape/land-cover features) measured within a 100 m radius (= 3.1384 ha) around 34 invertebrate sampling points in 34 oilseed rape fields between 0.82 and 159.22 ha in area; tarred road = asphalt road.

Landscape/land-cover feature (unit)	Average	−95% C.I.	+95 C.I.	Min.	Max
Arable land (ha)	2.46	2.27	2.65	0.93	2.92
Permanent vegetation: grassland, road verges (ha)	0.08	0.03	0.13	0	0.81
Linear woody features (m)	209.85	152.86	266.84	0	566.41
Linear woody features (ha)	0.181	0.120	0.241	0	0.946
Length of dirt road (m)	111.69	76.41	146.97	0	361.41
Coverage of dirt road (ha)					
Length of tarred (paved) road (m)	115.80	74.89	156.71	0	379.72
Coverage of tarred (paved) road (ha)					
Wood/mid-field copses (ha)	0.04	0.00	0.07	0	0.48
Forest (ha)	0.21	0.05	0.37	0	1.70
Wooded area (wood + forest + recently planted wood/forest) (ha)	0.27	0.10	0.45	0	1.70

Analysis of the eight edge habitat variables measured within a 100 m radius of the invertebrate sampling points (Table 1) in the 34 oilseed rape fields (Fig. 1) with respect to the number or percentage (%) of six functional invertebrate groupings and the most numerous insect orders sampled there yielded only a few statistically significant relationships. But the *P*-value of none of them met the threshold for multiple comparisons (at $P \leq 0.0043$; $k = 12$). Specifically, we found that the number of all invertebrates sampled was positively correlated with the area of dirt roads (Pearson correlation

Table 2
Component values and factor loadings of the Principal Component Analysis (PCA) of nine landscape/land-cover features measured within a 100 m radius around 34 invertebrate sampling points in 34 oilseed rape fields in SW Poland (see Table 1); factor rotation: varimax normalised; the figures in bold indicate the variable for which each factor exhibited the greatest variability.

Habitat variable	Axis (conventional description)			
	PC1 (Roads)	PC2 (Arable + woods)	PC3 (Hedge)	PC4 (Field area)
Field area (ha)	0.131	0.130	−0.133	**0.883**
Arable land (ha)	0.166	**−0.880**	0.051	0.319
Permanent vegetation (ha)	−0.354	−0.195	−0.489	−0.292
Linear woody features (ha)	0.196	−0.094	**0.876**	−0.135
Linear woody features (m)	−0.035	−0.119	**0.921**	−0.041
Dirt road (ha)	**0.905**	0.165	0.092	0.113
Dirt road (m)	**0.903**	0.120	0.208	0.023
Tarred road (ha)	**−0.904**	0.160	0.011	0.024
Tarred road (m)	**−0.942**	0.071	0.015	−0.012
Wood/mid-field copses (ha)	0.274	0.177	−0.381	−0.407
Forest (ha)	0.059	**0.901**	−0.022	0.288
Wooded area (ha)	0.121	**0.959**	−0.125	0.106
Eigenvalues	3.642	2.687	2.088	1.260
Variation explained	0.303	0.224	0.174	0.105

Note: The explanatory power of the above PCA derived variables as regards the abundance of the major invertebrate groups is poor: only PC2 (Arable + woods) was positively correlated with the numbers of *Meligethes aeneus* and oilseed rape pests, while % oilseed rape pests (Pearson $r = 0.358$, 0.362 and 0.359, $P \leq 0.048$); and PC3 (Hedge) was negatively correlated with %saprovores ($r = -0.396$, $P = 0.028$).

Table 3
Concentrations of 12 chemical elements measured in 14 invertebrate/insect taxa/species sampled by sweep netting in oilseed rape fields in SW Poland in spring 2015.

Sample No.	Taxa/species (functional group; sampling date)	K	Na	Ca	Mg	Cu	Zn	Fe	Mn	As	Cd	Co	Pb
1	*Meligethes aeneus* (oilseed rape pest; 15.V.15)	150.4	807.8	296.1	176.3	77.93	0.62	381.4	2.85	0.05	2.48	0.13	0.77
2	*Ceutorhynchus assimilis* (oilseed rape pest; 15.V.15)	150.4	767.1	284.0	185.1	71.69	4.68	135.1	1.28	0.41	1.71	0.26	1.76
3	*Prosternon tesselatum* (herbivore; 15.V.15)	150.4	809.6	287.1	187.6	86.15	5.00	402.9	3.18	0.05	5.05	0.20	1.70
4	*Dolycoris baccarum* (herbivore; 20.V.15)	28.2	763.1	261.7	164.2	77.56	26.38	363.4	8.34	0.11	1.83	0.40	1.85
5	*Oulema melanopus* (herbivore; 15.V.15)	26.86	732.2	263.6	158.9	38.20	7.68	487.1	9.69	0.13	1.74	0.25	1.87
6	*Phyllobius* sp. (herbivore; 15.V.15)	15.31	807.2	283.1	161.0	102.8	4.52	120.1	0.59	0.03	1.69	0.22	1.91
7	*Nabis ferus* (herbivore; 20.V.15)	21.83	777.4	339.2	163.3	124.8	6.85	225.9	0.55	0.04	2.91	0.21	2.13
8	*Scatophaga stercoraria* (saprovore; 20.V.15)	14.45	836.5	302.7	141.9	106.9	5.91	200.0	0.52	0.02	1.94	0.23	2.18
9	*Bibio hortulanus* (saprovore; 20.V.15)	9.82	805.5	287.7	152.5	107.8	8.02	238.3	0.36	0.01	1.56	0.21	2.19
10	Muscidae, Bibionidae, Calliphoridae (saprovore; 15.V.15)	5.81	799.5	294.1	158.6	108.6	6.76	232.4	0.19	0.09	1.71	0.25	2.19
11	Araneae (predator; 15.V.15)	19.65	827.7	238.8	187.6	31.32	24.39	407.5	5.60	0.07	2.05	0.27	2.00
12	*Cantharis fusca* (predator; 20.V.15)	138.3	851.2	269.3	173.0	17.89	9.48	301.7	0.53	0.01	1.57	0.23	2.09
13	Ichneumonidae (parasitoid; 15.V.15)	17.08	773.6	324.3	148.6	120.5	4.10	197.2	0.64	0.02	1.77	0.27	2.20
14	*Tersilochus heterocerus* parasitoid of *Meligethes aeneus* (parasitoid; 15.V.15)	90.54	723.0	290.0	160.5	107.6	10.62	276.9	0.48	0.03	1.62	0.15	2.31

Table 4
The full taxonomic list of invertebrates ($n = 12\,916$), classified into food guilds and functional groups, which were sampled in 34 oilseed rape fields in SW Poland in spring 2015. In each field, invertebrates were sampled using two yellow Moericke traps on six sampling days: 13 April, 16 April, 20 April, 23 April, 27 April and 5 May 2015.

Order	Family/taxa	Food guild	Food type	Functional group	#Field																															Total
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
	Araneae	predator	insects	predator	2	3	2		1		6	3	1		1	2		2	23	3	6	2			3		2		5	3		3	2	1	5	2	1	1	85
	Thysanoptera	herbivorous	grass	herbivorous		1	2						1				1			1			1	1			1		2		1		1					13
	Aphididae	herbivorous	plants	herbivorous					1			1		2				1			1				1				11	1				2		2		23
DIPTERA																																					
	Sciaridae	saprovorous	organic matter	saprovorous	116	47	46	32	31	23	43	53	116	77	47	17	48	52	27	27	44	18	20	47	50	53	191	47	45	32	250	37	21	41	24	19	33	27	1801
	Chironomidae	saprovorous	organic matter	saprovorous	89	9	14		15	10	66	40	66	12	22	14	21	22	6	25	19	12	17	8	6	21	72	15	2		85	14	7	3	3	6	21	17	759
	Cecidomyiidae	herbivorous	plants	herbivorous	3	1	1		4	2	1	9	24	5		2		2			6	1			4	2	21	2			8	4		1		2	6	2	113
	Phoridae	saprovorous	organic matter	saprovorous	6	8	11	3	1	5	1	4	4	3	3	7	4	2	4	2	1	1	5	5	4	3	3	1	1	7	3	3	3	1	1	3			113
	Cypselidae	saprovorous	organic matter	saprovorous	22	8	15	3	21	9	9	34	9	36	11	5	13	8	5	13	10	23	9	11	9	15	8	10	11	7	15	10	2	8	5	12	5	4	395
	Crossopalpus	predator	insects	predator	2	1	3	1	3	1	2	1		2		2	2			1	1			1		1												24
	Empididae	predator	insects	predator	2		1	2		4	1	2				1		1	1									1								2		18
	Drosophilidae	saprovorous	organic matter	saprovorous	3	6	5	1	2	6		11	17	4	18	1	6	3	4	3	5	3	3	2	6	6	3	1		6	6	14	7	17	1	2		5	177
	Muscidae	herbivorous	plants	herbivorous	49	165	106	172	151	235	137	83	143	57	101	63	111	116	50	171	87	14	28	63	167	149	191	406	55	153	56	148	60	118	323	62	178	80	4248
	Fungivoridae	saprovorous	organic matter	saprovorous	1			1	1	1		1					1			1	2	1				1	1		1	5	1		1		1	2	1	24
	Chloropidae	herbivorous	plants	herbivorous	3		2	7		1	2		2	2		1	2	1	1			9	2	1	3	2	12	2	1		4	3	1	1			4		69
	Bibionidae	detrivorous	organic matter	saprovorous	2	35	8	19	27	3	89	6	28	40	9	15	11	17	1	2	9		6	8	8	25	15	57	7	9	4	61	15	42	21	55	18	20	692
	Scatophagidae	coprophagous	organic matter	saprovorous	1				1	4	12	4	3	4			2			5	1	1	2	1	4	8	3	2	3			2		2		4			69
	Musidoridae	saprovorous	organic matter	saprovorous	1				1		1		1	1			2	1											1							1			10
	Syrphidae	predator	insects	predator		5			3	48		1	1	3		1	4					2			3	1		1	5	2						1			81
	Anthomyiidae	herbivorous	plants	herbivorous					2	25	1					1	2		1	2		2		6		8	99	1		1	7		23			7	18	5	211
	Sepsidae	saprovorous	organic matter	saprovorous					1						1			1	4												1				1				9
	Calliphoridae	saprovorous	organic matter	saprovorous						6	1	1		2	6		3			11			2	1				2		1	3		2						41
	Tachinidae	parasite	insects	parasite							1	1		1			2		1	12				1						1	1			1				1	23
	Ephydridae	herbivorous	plants	herbivorous								2			1										1							1							5
	Opomyzidae	herbivorous	plants	herbivorous										1																									1
	Trichoceridae	saprovorous	organic matter	saprovorous										1								2																	3
	Scatopsidae	saprovorous	organic matter	saprovorous										3	1																								4
	Agromyzidae	herbivorous	plants	herbivorous											2		1																	1					4
	Pipunculidae	parasite	insects	parasite													1																						1
	Stratiomyidae	saprovorous	organic matter	saprovorous																											1								1
COLEOPTERA																																							
	Atomaria	saprovorous	organic matter	saprovorous	1			2	1																		1			3	1								9
	Stilbus	saprovorous	organic matter	saprovorous	1						1											1					1												4
	Olibrus	saprovorous	organic matter	saprovorous	1															1																				2
	Ceutorhynchus assimilis	herbivorous	oil-seed rape	oil-seed rape	1	3			1	4					4	2	4	1	5	2	5		3	1	2	10	4	1		3	2	1	1						60
	Ceutorhynchus pallidactylus	herbivorous	oil-seed rape	oil-seed rape		1	1				1		6	4			4						1	1															19
	Ceutorhynchus melanostictus	herbivorous	oil-seed rape	oil-seed rape		1																																	1
	Ceutorhynchus rugulosus	herbivorous	oil-seed rape	oil-seed rape					1				2	1					3			1			1	2		1	1		1		1						15
	Ceutorhynchus	herbivorous	plants	herbivorous				1		1	1				1		1		2	2				1		1									1		1		13
	Curculionidae	herbivorous	plants	herbivorous	1																1	2								2						1		7
	Curculionidae inne	herbivorous	plants	herbivorous										1												1													2
	Phyllotreta	herbivorous	plants	herbivorous	2					1	1			1	2	1		1		1			2		1	1	1			4	1	1		1			1		23
	Chaetocnema	herbivorous	plants	herbivorous	1			1				4	1		3				1	3						2	2				2	2	2				3		27
	Longitarsus	herbivorous	plants	herbivorous	1	2						1			2			2	1	1				1	1	3	1	1		1		2		2				1	23
	Tachyporus	predator	insects	predator	5	3	6	4	3	3	3	12	6	4	15	7	2	4	14	5	5	1	5	4	4	8	3	2		8	2	5	5	10	3	3	3		167
	Philonthus	predator	insects	predator	1	4	3	1	15					2	4	1	2	1	12	1	1	2	2		1		2		2	2	1	3	1		3		2			69

Gymnusa	predator	insects	predator	9		5	2	1	1	3			4	1	1		1	1			1	1		1	1	1			1					1	1			37
Aleochara	saprovorous	organic matter	saprovorous	28	9	10	11	15	31	12	13	20	27	25	4	12	9	9	15	14	3	5	11	9	12	15	15	8	13	26	4	10	12	10	4	8	10	439
Heterothops	predator	insects	predator	2		1			1					1			2		2	2				1					2		1					1		16
Lathrobium	predator	insects	predator	3	1	3	7	2	1	1	4	4	4	7	1	3	6	3	5	2		2	2	2	2	3	1	1	2	1	2	1		2	3	1		82
Oulema melanopus	herbivorous	crops	herbivorous		2	5	1	1	2				5	2	4	2		3	4	1		3	1	1	2	2	1	2	3	1			1	2					51
Oulema cianella	herbivorous	crops	herbivorous																									1										1
Cartodere	saprovorous	organic matter	saprovorous	1				1			1			1				1	1							1	1		1				1						10
Meligethes	herbivorous	oil-seed rape	oil-seed rape	40	16	48	21	62	197	18	6	27	34	178	58	102	8	36	100	31	17	51	44	50	33	46	58	40	46	25	57	55	62	54	21	17	20	1678
Aphodius	detrivorous	organic matter	saprovorous	3		1	1	1			2	1		7	2		2	5	1	1	3		2			1	1	1		2			1		1	1	1	41
Cyphon	herbivorous	plants	herbivorous	2																1										1								4
Bembidion	predator	insects	predator	1			1	1						4		1	1	1	3										2		1			1			1	18
Amara	herbivorous	plants	herbivorous	2			1	1		4		2		4	3	4	1	2	6	2	1		3	4	5	1	1	2	9	2	2	3		7	2	1		75
Poecilus	predator	insects	predator			1								1																	1		1	1				5
Acrotrichis	saprovorous	organic matter	saprovorous			1					1		1															1										4
Corticarina	saprovorous	organic matter	saprovorous				1		2				1	1	1	2	1										1	3	1	2								16
Sitona	herbivorous	plants	herbivorous				1			1				1		1			1	1														1				7
Oxytelus	saprovorous	organic matter	saprovorous					1	1				1			1		1	2					1		1		1	1		1				1	1	14
Harmonia axyridis	predator	insects	predator					1																														1
Agathidium	saprovorous	organic matter	saprovorous					2																														2
Demetrias atricapillus	predator	insects	predator						1																													1
Loricera	predator	insects	predator						3									1	1	1		1																7
Quedius	predator	insects	predator						1																													1
Thanatophilus rugosus	scavenger	carrion	saprovorous						1																									1				2
Harpalus affinis	predator	insects	predator							1																												1
Harpalus	predator	insects	predator									1						1	1					1	1	2												7
Notoxus	saprovorous	organic matter	saprovorous							3							1						1						1					1		1		8
Aphthona	herbivorous	plants	herbivorous								1						1																					2
Phyllobius	herbivorous	plants	herbivorous								1																											1
Haploglossa	saprovorous	organic matter	saprovorous									1																									1	2
Glischrochilus	herbivorous	plants	herbivorous									1															1											2
Glischrochilus quadrisignatus	herbivorous	plants	herbivorous																											1								1
Agriotes	herbivorous	plants	herbivorous									1						6	1				1								1	1						11
Corymbites	herbivorous	plants	herbivorous									1																										1
Scymnus	predator	insects	predator										1							1		1							1										4
Catops	saprovorous	organic matter	saprovorous											1									1						1										3
Coccinella septempunctata	predator	insects	predator												1														1	1				1				4
Cercyon	saprovorous	organic matter	saprovorous												1										1					1								3
Onthophagus	saprovorous	organic matter	saprovorous														1							2														3
Oedemera	herbivorous	plants	herbivorous														1																					1
Cleonus	herbivorous	plants	herbivorous															1																				1
Necrophorus	scavenger	carrion	saprovorous																1																			1
Eumenidae	predator	insects	predator																	1																		1
Acidota	saprovorous	organic matter	saprovorous																		1																	1
Stenus	predator	insects	predator																		1																	1
Trox	saprovorous	organic matter	saprovorous																		1																	1
Trox sabulosus	saprovorous	organic matter	saprovorous																		1																	1
Hister	predator	insects	predator																		2				2	1			1				1				1	8
Elaphrus	predator	insects	predator																				1								1							2
Elaphrus cupreus	predator	insects	predator																										2									2
Cassida	herbivorous	plants	herbivorous																				1	1														2
Aulacobaris lepidii	herbivorous	plants	herbivorous																							1												1

(continued on next page)

Table 4 (*continued*)

Order	Family/taxa	Food guild	Food type	Functional group	#Field																													Total
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
	Coccinellidae	predator	insects	predator																							1										1
	Propylea	herbivorous	plants	herbivorous																								1		1					1		3
	Clivina	predator	insects	predator																									1								1
	Calathus	predator	insects	predator																									1	1							2
	Psylliodes	herbivorous	plants	herbivorous																											1						1
	Anthicus	saprovorous	organic matter	saprovorous																												1					1
	Apion	herbivorous	plants	herbivorous																													1		1		2
	Chrysomela	herbivorous	plants	herbivorous																														1	1	1	3
	Coleoptera larva			herbivorous																															4		4
HYMENOPTERA																																					
	Tenthredinidae	herbivorous	plants	herbivorous	1	4	1		1				1	2	1	7	2	1		1	1		1		2	1	2	1	4	9		1						44
	Tenthredo	herbivorous	plants	herbivorous	1					1																									1			3
	Dolerus	herbivorous	plants	herbivorous	2			1	1		1	1		3	1		1	1	3								3					1	1		1	1		22
	Apis mellifera	herbivorous	pollen	pollen		6	1				1														1		1	1				6		2				19
	Apidae	herbivorous	pollen	pollen	3	6	2		25	15			2	2	2	15	45	29	7	40	7	12	6	8	11	27	12	9	5	2	8	9	25		8	4		2	348
	Eulophidae	parasite	insects	parasite	1	1	1							1			1						1	1							3	1						11
	Diaeretus	parasite	insects	parasite	1							2	2		1								1	2	2		2						4	3	3		1	1	25
	Aphidius	parasite	aphids	parasite	3			1	1	2			1					1	1	3	1					1	5							1	2	2		1	26
	Formica	predator	insects	predator						1		1							1		1										1						1	6
	Formicidae	predator	insects	predator	1																										1							2
	Ichneumonidae	parasite	insects	parasite	2				2	1			4	2	3	1	2	1	1	2	1		1			3	3		2	1				4			1		37
	Monelata	parasite	insects	parasite	1		1		1	1		1					3	2		1						1				1		1						14
	Blacus	parasite	insects	parasite		1														1														1				3
	Habrocytus	parasite	insects	parasite		1																					1											2
	Pteromalidae	parasite	insects	parasite			1		1					1	1																								4
	Aphanogmus	parasite	insects	parasite				1												1	1					1				1								5
	Thersilochus	parasite	insects	parasite				1		1		1		1				1		1					1				3	2						1		13
	Asolcus	parasite	insects	parasite					1	3			1		1												1	1										8
	Bombus	herbivorous	pollen	pollen						3						6							1		3							1				1		15
	Rhizarcha	parasite	insects	parasite						1				1			1										2				1	1						7
	Trybliographa	parasite	insects	parasite						1				1					1			1						2	2	1	2	1					1	13
	Vespula	predator	insects	predator						1																			3		1							5
	Pompilidae	predator	insects	predator						6	1						2						1				1	1		1			1					14
	Xyella	herbivorous	plants	herbivorous							1																											1
	Platygaster	predator	insects	predator												1										1												2
	Nomada	herbivorous	pollen	pollen													3			1																		4
	Braconidae	parasite	insects	parasite														2																				2
	Myrmica	predator	insects	predator															1																			1
	Encyrtidae	parasite	insects	parasite																			1															1
	Lasius	predator	insects	predator																			1								1							2
	Harmolita	herbivorous	plants	herbivorous																				1														1
	Charips	herbivorous	plants	herbivorous																								1	1				5	1				8
	Polistes	predator	insects	predator																											1							1
HETEROPTERA																																					
	Dolycoris	herbivorous	plants	herbivorous	1																																	1
	Palomena	herbivorous	plants	herbivorous	1																				1				1									3
	Eremocoris erraticus	herbivorous	plants	herbivorous					1		1								4		1	1		1	1	2	1									1		14
	Aelia	herbivorous	plants	herbivorous					1					1																								2
	Lygus	herbivorous	plants	herbivorous						1								1	2												1							5
	Kleidocerys	herbivorous	plants	herbivorous							1	1		1					1		1	9			1		1	1	3		1			1				22

Nabis	predator	insects	predator								1					1										1											1	4
Pyrrhocoris	herbivorous	plants	herbivorous										1					1																				2
Stenodema	herbivorous	plants	herbivorous										1																									1
Thyreocoris	herbivorous	plants	herbivorous															1														1				1		3
Thyreocoris scarabaeoides	herbivorous	plants	herbivorous											1																								1
Eurydema	herbivorous	plants	herbivorous															1																				1
Sehirus	herbivorous	plants	herbivorous																1																			1
Chartoscirta	herbivorous	plants	herbivorous																	1																		1
Orius	predator	insects	predator																		1																	1
Saldidae	herbivorous	plants	herbivorous																						1													1
HOMOPTERA																																						
Trioza	herbivorous	plants	herbivorous	1	2	1		1			1		2	1	4			1	3				2	2		1	1		1	1	2	1						28
Calligypona	herbivorous	plants	herbivorous	1		1				1		1	2	7	2	1	3	1					2	2					1	3	3			4		1	2	38
Empoasca	herbivorous	plants	herbivorous			3	1	1	1				1			2	1		2		3	1	1	1		1	1	1	2		1	3						27
Aphalara	herbivorous	plants	herbivorous					1										1	2						1		1			1								7
Trialeurodes	herbivorous	plants	herbivorous								1																											1
Psammotettix	herbivorous	plants	herbivorous																1	1																		2
Philaenus	herbivorous	plants	herbivorous																		2																	2
Aphrodes	herbivorous	plants	herbivorous																				1															1
ORTHOPTERA																																						
Tetrix	herbivorous	plants	herbivorous				1										1		1				1						1								1	6
Tettigonidae larva	herbivorous	plants	herbivorous																						1													1
LEPIDOPTERA																																						
Gonepteryx rhamni	herbivorous	plants	herbivorous					1																														1
Pieris	herbivorous	plants	herbivorous												1																							1
Eriocraniidae	herbivorous	plants	herbivorous																			1																1
Crambus	herbivorous	plants	herbivorous							1																												1
NEUROPTERA																																						
Raphidia notata	predator	insects	predator					1																														1
Chrysopa	predator	insects	predator																			1														1		2
		Total per field		428	352	313	303	416	673	431	313	502	370	507	256	442	317	265	500	278	158	188	252	380	422	746	656	239	366	542	411	268	345	497	222	348	210	

Table 5
Pearson correlation coefficients testing the relationships between abundance and percentage (%) in the community of major invertebrate groups, and habitat variables of 34 oilseed rape fields. The relationships that meet the FDR-adjusted *P*-value are shown in red font; black font – $P \leq 0.05$; grey font – $P > 0.05$.

Habitat variable	All invertebrates		Ceutorhynchus		Meligethes		Predators		Herbivores		Saprovores		Parasitoid		Oil-seed rape pests		Pollinators	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p
Field area	0.133	0.454	-0.080	0.655	0.091	0.608	0.138	0.437	0.114	0.520	0.081	0.649	0.044	0.804	0.085	0.635	-0.258	0.162
Arable land	0.092	0.606	-0.192	0.277	-0.269	0.124	-0.296	0.089	0.174	0.325	0.199	0.258	-0.041	0.818	-0.278	0.111	-0.134	0.474
Permanent vegetation	-0.165	0.350	**0.511**	**0.002**	-0.181	0.306	-0.110	0.537	-0.081	0.649	-0.121	0.497	-0.123	0.487	-0.144	0.417	0.106	0.570
Linear woody features (ha)	0.183	0.299	-0.157	0.375	0.197	0.265	0.241	0.169	0.241	0.169	-0.108	0.544	0.114	0.522	0.183	0.299	0.144	0.438
Linear woody features (m)	0.242	0.168	-0.173	0.328	0.158	0.371	0.229	0.193	**0.427**	**0.012**	-0.104	0.559	0.098	0.582	0.145	0.415	0.052	0.779
Dirt road (ha)	**0.370**	**0.031**	-0.166	0.347	0.224	0.203	0.212	0.229	0.275	0.116	0.214	0.223	-0.015	0.931	0.209	0.235	-0.090	0.632
Dirt road (m)	**0.353**	**0.040**	-0.102	0.567	0.167	0.346	0.189	0.284	0.279	0.111	0.206	0.242	-0.059	0.740	0.157	0.374	-0.064	0.733
Asphalt road (ha)	-0.273	0.118	0.129	0.466	-0.193	0.275	-0.045	0.801	-0.131	0.459	-0.220	0.212	-0.005	0.977	-0.181	0.305	-0.119	0.523
Asphalt road (m)	-0.216	0.220	0.128	0.471	-0.222	0.208	-0.087	0.625	-0.094	0.596	-0.145	0.412	0.078	0.663	-0.210	0.233	-0.047	0.804
Woodlot (ha)	0.004	0.982	-0.061	0.731	-0.111	0.531	-0.102	0.565	-0.309	0.076	**0.445**	**0.008**	0.072	0.684	-0.114	0.521	-0.188	0.311
Forest (ha)	0.137	0.439	0.255	0.146	**0.427**	**0.012**	0.338	0.051	0.011	0.950	-0.110	0.535	0.105	0.554	**0.439**	**0.009**	0.256	0.164
Wooded area (ha)	0.064	0.719	0.183	0.300	**0.344**	**0.047**	0.264	0.132	-0.106	0.550	-0.039	0.828	0.141	0.426	**0.351**	**0.042**	0.153	0.410

(continued)

Habitat variable	Diptera		Coleoptera		Oulema melanopus		%predators		%herbivores		%saprovores		%parasitoids		%oil-seed rape pests		%pollinators	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p
Field area	0.134	0.449	0.104	0.560	-0.002	0.993	0.017	0.926	0.146	0.410	-0.007	0.968	0.040	0.822	-0.049	0.784	**-0.357**	**0.038**
Arable land	0.242	0.167	-0.229	0.192	-0.286	0.102	-0.259	0.138	0.257	0.143	0.090	0.613	-0.095	0.594	-0.338	0.050	-0.247	0.158
Permanent vegetation	-0.125	0.481	-0.160	0.367	0.008	0.964	0.020	0.909	-0.013	0.940	-0.039	0.828	-0.028	0.875	-0.013	0.941	0.150	0.397
Linear woody features (ha)	0.093	0.603	0.239	0.174	0.031	0.863	0.094	0.598	0.198	0.261	-0.237	0.177	0.008	0.963	0.048	0.789	0.019	0.914
Linear woody features (m)	0.178	0.314	0.187	0.289	-0.113	0.524	0.091	0.608	**0.368**	**0.032**	-0.273	0.119	-0.064	0.721	-0.069	0.699	0.008	0.965
Dirt road (ha)	**0.351**	**0.042**	0.209	0.235	-0.102	0.566	-0.062	0.728	0.164	0.353	-0.022	0.900	-0.197	0.264	-0.043	0.809	-0.187	0.290
Dirt road (m)	**0.340**	**0.049**	0.156	0.379	-0.072	0.685	-0.007	0.970	0.175	0.322	-0.060	0.736	-0.226	0.198	-0.058	0.744	-0.124	0.486
Asphalt road (ha)	-0.259	0.140	-0.163	0.356	-0.024	0.892	0.217	0.218	-0.035	0.844	-0.090	0.612	0.158	0.372	0.038	0.830	0.056	0.752
Asphalt road (m)	-0.174	0.326	-0.201	0.255	-0.066	0.711	0.144	0.416	-0.041	0.820	-0.026	0.885	0.210	0.234	-0.030	0.867	0.028	0.874
Woodlot (ha)	0.044	0.806	-0.085	0.634	-0.016	0.927	-0.048	0.787	**-0.449**	**0.008**	**0.511**	**0.002**	0.210	0.234	-0.022	0.902	-0.135	0.447
Forest (ha)	-0.027	0.880	**0.353**	**0.040**	0.105	0.556	0.133	0.455	-0.134	0.449	-0.189	0.284	-0.036	0.840	**0.359**	**0.037**	0.279	0.111
Wooded area (ha)	-0.077	0.664	0.268	0.125	0.109	0.539	0.129	0.467	-0.242	0.168	-0.062	0.727	0.138	0.437	**0.340**	**0.049**	0.206	0.243

coefficient, $r = 0.307$, $P = 0.031$). Further, both the number and percentage (%) of the herbivorous insects were positively correlated with the length of linear woody features surrounding the fields ($r = 0.427$ and 0.368, $P = 0.012$ and 0.032, respectively; Fig. 2A); the number of saprophages was positively correlated with the area of woods ($r = 0.447$, $P = 0.008$; Fig. 2B); the number and percentage (%) of oilseed rape pests were positively correlated with the forest ($r = 0.439$ and 0.359, $P = 0.009$ and 0.037, respectively) and wooded area ($r = 0.359$ and 0.344, $P = 0.037$ and 0.046, respectively); and the numbers of all invertebrates and Diptera (all species) were correlated with the length of dirt roads ($r = 0.363$ and 0.340, $P = 0.045$ and 0.049, respectively). Interestingly, we found that the number of the pooled four species of true weevils of the tribe *Ceutorhynchus* spp. (*C. assimilis* = *C. obstrictus*, *C. pallidactylus*, *C. melanostictus*, *C. rugulosus*) was positively correlated with the area of permanent vegetation ($r = 0.512$, $P = 0.002$; Fig. 2C), while the number of pollen beetles *Meligethes aeneus* was positively correlated with the area of forests ($r = 0.427$, $P = 0.012$; Fig. 2D), woods ($r = 0.351$ and, $P = 0.042$), and with the total wooded area ($r = 0.344$, $P = 0.047$). Similarly, the number of Coleoptera (all species) was positively correlated with the area of forests ($r = 0.353$, $P = 0.040$).

The only negative statistically significant relationship was between the percentage (%) of herbivorous insects and the area of woods ($r = -0.462$, $P = 0.009$).

The concentrations of Na, Ca, Mg, Cu, Zn, Fe, As, Co and Pb varied significantly between two oilseed rape pest taxa, *M. aeneus* and *Ceutorhynchus* spp., sampled on the same fields (*t*-test for dependent samples, in all cases, $P \leq 0.008$).

2. Experimental design, materials and method

2.1. The study area

The 35 winter oilseed rape fields were managed using conventional amounts of agrochemicals, including pesticides and fertilisers. The landowner (Top Farms Wielkopolska Co., Poland) supplied management data on agricultural practices in a few large fields for the study year; both the timing

Table 6
Results of *post-hoc* tests (Tukey's test with Spjotvoll and Stoline modification for an unequal sample size) comparing the concentrations of 12 chemical elements between the different groupings of organisms of oilseed rape crops depicted on Fig. 2 in Ref [1]; statistically significant differences (at $P \leq 0.05$) are shown in bold.

K	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	1													
Ceutorhynchus spp. {3}	**0.000**	**0.000**												
Meligethes aeneus {4}	**0.000**	**0.000**	1.000											
Oulema melanopus {5}	**0.000**	**0.000**	1.000	1.000										
other herbivores {6}	0.585	0.627	0.329	0.325	0.327									
Diptera {7}	1.000	1.000	**0.000**	**0.000**	**0.000**	0.369								
Aphodius sp. {8}	**0.000**	**0.000**	1.000	1.000	1.000	0.217	**0.000**							
other saprophages {9}	**0.048**	0.056	1.000	1.000	1.000	0.987	**0.020**	0.999						
Coleoptera {10}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	1.000	**0.000**	**0.000**	0.936					
Hister sp. {11}	**0.010**	**0.013**	0.643	0.639	0.641	1.000	**0.002**	0.464	1.000	0.984				
Coccinella septempunctata {12}	**0.000**	**0.000**	1.000	1.000	1.000	0.206	**0.000**	1.000	0.999	0.086	0.776			
other predators {13}	0.998	0.998	0.567	0.564	0.566	1.000	0.988	0.463	0.960	1.000	0.999	0.451		
PARASITES {14}	0.977	0.982	0.789	0.787	0.788	1.000	0.932	0.699	0.995	1.000	1.000	0.687	1.000	
All other insects {15}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	1.000	0.000	**0.000**	0.998	0.904	1.000	0.370	1.000	1.000

Na	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	0.172	**0.000**												
Meligethes aeneus {4}	**0.000**	0.837	**0.000**											
Oulema melanopus {5}	0.980	**0.000**	**0.004**	**0.000**										
other herbivores {6}	0.086	**0.000**	**0.002**	**0.000**	0.363									
Diptera {7}	**0.000**	0.987	**0.000**	1.000	**0.000**	**0.000**								
Aphodius sp. {8}	0.997	**0.000**	0.995	**0.000**	0.353	0.016	**0.000**							
other saprophages {9}	0.151	**0.000**	**0.008**	**0.000**	0.453	1.000	**0.000**	0.041						
Coleoptera {10}	**0.000**	0.735	**0.000**	**0.002**	**0.000**	**0.000**	**0.019**	**0.000**	**0.000**					
Hister sp. {11}	0.305	**0.000**	**0.006**	**0.000**	0.822	1.000	**0.000**	0.060	0.999	**0.000**				
Coccinella septempunctata {12}	**0.017**	1.000	0.337	1.000	**0.002**	**0.000**	1.000	0.091	**0.000**	1.000	**0.000**			
other predators {13}	0.341	**0.000**	**0.050**	**0.000**	0.653	1.000	**0.000**	0.150	1.000	**0.000**	0.999	**0.000**		
PARASITES {14}	0.817	**0.000**	0.293	**0.002**	0.970	1.000	**0.001**	0.565	1.000	**0.000**	1.000	**0.000**	1.000	
All other insects {15}	1.000	**0.000**	**0.008**	**0.000**	1.000	0.212	**0.000**	0.784	0.302	**0.000**	0.611	**0.004**	0.517	0.926

Ca	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	**0.000**	0.706												
Meligethes aeneus {4}	**0.000**	**0.000**	**0.000**											
Oulema melanopus {5}	0.791	**0.000**	0.116	**0.000**										
other herbivores {6}	1.000	0.094	0.507	**0.000**	0.998									
Diptera {7}	**0.008**	**0.002**	0.740	**0.000**	0.995	0.945								

(*continued on next page*)

Table 6 (*continued*)

K	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
Aphodius sp. {8}	**0.001**	0.673	1.000	0.000	0.377	0.631	0.989							
other saprophages {9}	1.000	0.250	0.717	0.002	1.000	1.000	0.980	0.807						
Coleoptera {10}	**0.000**	**0.000**	**0.000**	1.000	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**					
Hister sp. {11}	1.000	**0.007**	0.151	**0.000**	0.982	1.000	0.746	0.244	1.000	**0.000**				
Coccinella septempunctata {12}	**0.000**	0.378	0.056	1.000	**0.000**	**0.000**	**0.004**	**0.033**	**0.000**	1.000	**0.000**			
other predators {13}	1.000	0.950	0.999	0.218	1.000	1.000	1.000	1.000	1.000	0.121	1.000	**0.039**		
PARASITES {14}	1.000	0.459	0.838	**0.018**	0.999	1.000	0.988	0.893	1.000	**0.008**	1.000	**0.002**	1.000	
All other insects {15}	**0.000**	0.999	0.999	**0.000**	**0.005**	0.249	0.063	0.995	0.469	**0.000**	**0.038**	0.164	0.990	0.663
Mg	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	**0.000**	**0.000**												
Meligethes aeneus {4}	**0.000**	**0.000**	**0.001**											
Oulema melanopus {5}	0.553	**0.000**	0.145	**0.000**										
other herbivores {6}	0.488	1.000	**0.000**	**0.000**	**0.050**									
Diptera {7}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.657								
Aphodius sp. {8}	**0.000**	**0.000**	1.000	0.051	0.057	**0.000**	**0.000**							
other saprophages {9}	0.979	1.000	0.052	**0.000**	0.582	1.000	0.410	**0.030**						
Coleoptera {10}	**0.000**	**0.000**	1.000	**0.001**	0.060	0.000	**0.000**	1.000	0.036					
Hister sp. {11}	0.987	0.901	**0.004**	**0.000**	0.386	0.994	**0.002**	0.001	1.000	**0.002**				
Coccinella septempunctata {12}	**0.001**	**0.000**	0.708	1.000	0.053	**0.000**	**0.000**	0.830	**0.000**	0.790	**0.000**			
other predators {13}	0.773	1.000	0.026	**0.000**	0.292	1.000	0.996	**0.016**	1.000	**0.019**	0.996	**0.000**		
PARASITES {14}	0.993	1.000	0.215	**0.005**	0.806	1.000	0.814	0.154	1.000	0.174	1.000	**0.001**	1.000	
All other insects {15}	**0.000**	0.455	**0.000**	**0.000**	**0.000**	0.999	0.059	**0.000**	0.968	**0.000**	0.202	**0.000**	1.000	0.998
Cu	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	0.983													
Ceutorhynchus spp. {3}	**0.000**	**0.000**												
Meligethes aeneus {4}	**0.000**	**0.000**	**0.001**											
Oulema melanopus {5}	**0.000**	**0.000**	1.000	**0.000**										
other herbivores {6}	0.999	1.000	**0.008**	0.588	**0.002**									
Diptera {7}	**0.000**	**0.000**	0.225	**0.000**	0.954	**0.000**								
Aphodius sp. {8}	**0.000**	**0.000**	1.000	0.076	0.991	**0.018**	0.190							
other saprophages {9}	1.000	1.000	**0.006**	0.377	**0.002**	1.000	**0.000**	**0.013**						
Coleoptera {10}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.028**					
Hister sp. {11}	1.000	1.000	**0.000**	**0.003**	**0.000**	0.999	**0.000**	**0.000**	1.000	**0.001**				
Coccinella septempunctata {12}	0.486	0.845	0.383	1.000	0.179	0.992	**0.025**	0.546	0.918	**0.000**	0.488			
other predators {13}	**0.001**	**0.006**	1.000	0.831	1.000	**0.028**	1.000	1.000	**0.005**	**0.000**	**0.001**	0.349		
PARASITES {14}	1.000	1.000	**0.029**	0.500	**0.012**	1.000	**0.002**	**0.049**	1.000	0.362	1.000	0.923	**0.001**	
All other insects {15}	**0.001**	**0.000**	**0.000**	**0.000**	**0.000**	0.355	**0.000**	**0.000**	0.940	**0.000**	0.873	**0.007**	**0.000**	0.999

Zn	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	1.000													
Ceutorhynchus spp. {3}	**0.000**	**0.000**												
Meligethes aeneus {4}	0.856	0.998	**0.001**											
Oulema melanopus {5}	**0.000**	**0.001**	1.000	0.057										
other herbivores {6}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**									
Diptera {7}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.535								
Aphodius sp. {8}	**0.000**	**0.000**	1.000	**0.008**	1.000	**0.000**	**0.000**							
other saprophages {9}	0.900	0.802	**0.014**	0.546	**0.030**	0.381	1.000	**0.012**						
Coleoptera {10}	0.999	1.000	**0.000**	1.000	**0.005**	**0.000**	**0.000**	**0.001**	0.726					
Hister sp. {11}	1.000	1.000	0.371	1.000	0.602	**0.000**	**0.038**	0.340	0.839	1.000				
Coccinella septempunctata {12}	0.715	0.853	1.000	0.979	1.000	**0.000**	**0.000**	1.000	**0.022**	0.913	0.812			
other predators {13}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.038**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**		
PARASITES {14}	0.926	0.860	0.060	0.676	0.102	0.877	1.000	0.055	1.000	0.807	0.885	0.081	**0.000**	
All other insects {15}	**0.001**	**0.019**	0.792	0.351	0.998	**0.000**	**0.000**	0.905	0.106	**0.041**	0.930	1.000	**0.000**	0.234

Fe	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	0.293	**0.000**												
Meligethes aeneus {4}	**0.000**	**0.000**	0.594											
Oulema melanopus {5}	0.756	**0.000**	1.000	0.558										
other herbivores {6}	0.330	1.000	**0.022**	**0.001**	**0.035**									
Diptera {7}	**0.000**	1.000	**0.000**	**0.000**	**0.000**	1.000								
Aphodius sp. {8}	0.180	**0.000**	1.000	0.994	1.000	**0.008**	**0.000**							
other saprophages {9}	0.998	0.989	0.789	0.286	0.853	0.999	0.971	0.624						
Coleoptera {10}	**0.000**	**0.000**	**0.001**	0.547	**0.001**	**0.000**	**0.000**	0.093	**0.044**					
Hister sp. {11}	1.000	**0.003**	1.000	0.948	1.000	0.113	**0.001**	1.000	0.966	0.344				
Coccinella septempunctata {12}	0.984	**0.001**	1.000	1.000	1.000	**0.004**	**0.001**	1.000	0.505	0.998	1.000			
other predators {13}	0.095	0.999	**0.009**	**0.001**	**0.013**	0.994	1.000	**0.004**	0.649	**0.000**	**0.035**	**0.003**		
PARASITES {14}	0.998	1.000	0.866	0.471	0.906	1.000	1.000	0.755	1.000	0.142	0.976	0.666	0.803	
All other insects {15}	**0.000**	**0.000**	**0.000**	**0.045**	**0.000**	**0.000**	**0.000**	**0.005**	**0.015**	0.999	0.123	0.970	**0.000**	0.069

Mn	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.042**													
Ceutorhynchus spp. {3}	0.931	**0.000**												
Meligethes aeneus {4}	0.969	**0.000**	1.000											
Oulema melanopus {5}	1.000	**0.021**	1.000	1.000										
other herbivores {6}	**0.001**	0.117	**0.000**	**0.000**	**0.000**									
Diptera {7}	0.094	1.000	**0.000**	**0.000**	0.068	0.077								
Aphodius sp. {8}	0.876	**0.000**	1.000	1.000	0.996	**0.000**	**0.001**							
other saprophages {9}	1.000	0.924	1.000	1.000	1.000	**0.001**	0.959	1.000						
Coleoptera {10}	1.000	0.060	0.889	0.942	1.000	**0.002**	0.131	0.828	1.000					

(*continued on next page*)

Table 6 (*continued*)

K	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
Hister sp. {11}	1.000	0.942	1.000	1.000	1.000	**0.001**	0.978	1.000	1.000	1.000				
Coccinella septempunctata {12}	1.000	1.000	0.996	0.998	1.000	**0.017**	1.000	0.985	0.997	1.000	1.000			
other predators {13}	0.177	0.757	0.052	0.063	0.111	1.000	0.686	**0.035**	**0.038**	0.190	0.141	0.447		
PARASITES {14}	1.000	0.998	1.000	1.000	1.000	0.057	0.999	1.000	1.000	1.000	1.000	1.000	0.083	
All other insects {15}	1.000	**0.025**	0.968	0.988	1.000	**0.001**	0.059	0.926	1.000	1.000	1.000	1.000	0.161	1.000
As	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	1.000													
Ceutorhynchus spp. {3}	1.000	1.000												
Meligethes aeneus {4}	1.000	1.000	1.000											
Oulema melanopus {5}	1.000	1.000	1.000	1.000										
other herbivores {6}	1.000	1.000	1.000	1.000	1.000									
Diptera {7}	0.995	1.000	0.996	0.996	0.999	1.000								
Aphodius sp. {8}	1.000	1.000	1.000	1.000	1.000	1.000	0.999							
other saprophages {9}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Coleoptera {10}	0.915	0.990	0.932	0.917	0.976	1.000	1.000	0.984	1.000					
Hister sp. {11}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Coccinella septempunctata {12}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
other predators {13}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
PARASITES {14}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
All other insects {15}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.018**	**0.000**	**0.000**	0.088	**0.000**	**0.001**	**0.018**	0.359	0.355
Cd	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.035**													
Ceutorhynchus spp. {3}	**0.005**	**0.000**												
Meligethes aeneus {4}	0.602	**0.000**	0.886											
Oulema melanopus {5}	0.069	**0.000**	1.000	0.990										
other herbivores {6}	0.908	0.141	1.000	1.000	1.000									
Diptera {7}	0.846	**0.000**	0.676	1.000	0.941	0.999								
Aphodius sp. {8}	0.118	**0.000**	1.000	0.995	1.000	1.000	0.967							
other saprophages {9}	1.000	1.000	0.992	1.000	0.996	0.954	1.000	0.997						
Coleoptera {10}	**0.003**	1.000	**0.000**	**0.000**	**0.000**	0.087	**0.000**	**0.000**	0.998					
Hister sp. {11}	1.000	0.997	0.746	0.995	0.821	0.776	0.999	0.834	1.000	0.985				
Coccinella septempunctata {12}	1.000	0.726	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.600	0.999			
other predators {13}	1.000	1.000	1.000	1.000	1.000	0.996	1.000	1.000	1.000	1.000	1.000	1.000		
PARASITES {14}	1.000	1.000	0.999	1.000	0.999	0.990	1.000	0.999	1.000	1.000	1.000	1.000	1.000	
All other insects {15}	0.065	1.000	**0.000**	**0.000**	**0.000**	0.191	**0.000**	**0.000**	1.000	1.000	0.999	0.803	1.000	1.000
Co	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	**0.014**	**0.000**												

Meligethes aeneus {4}	1.000	**0.000**	0.026											
Oulema melanopus {5}	0.542	**0.000**	1.000	0.659										
other herbivores {6}	1.000	**0.000**	1.000	1.000	1.000									
Diptera {7}	0.000	**0.003**	**0.000**	**0.000**	**0.000**	**0.000**								
Aphodius sp. {8}	0.599	**0.000**	1.000	0.708	1.000	1.000	**0.000**							
other saprophages {9}	1.000	**0.000**	1.000	1.000	1.000	1.000	**0.000**	1.000						
Coleoptera {10}	0.000	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**					
Hister sp. {11}	1.000	**0.000**	0.987	1.000	1.000	1.000	**0.000**	1.000	1.000	**0.000**				
Coccinella septempunctata {12}	1.000	**0.000**	1.000	1.000	1.000	1.000	**0.000**	1.000	1.000	**0.000**	1.000			
other predators {13}	1.000	**0.000**	1.000	1.000	1.000	1.000	**0.000**	1.000	1.000	**0.000**	1.000	1.000		
PARASITES {14}	1.000	**0.000**	1.000	1.000	1.000	1.000	**0.000**	1.000	1.000	**0.000**	1.000	1.000	1.000	
All other insects {15}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.162	**0.000**	**0.000**	0.282	**0.000**	**0.001**	0.079	0.703	0.582

Pb	Plant {1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}	{13}	{14}
POLLINATORS {2}	**0.000**													
Ceutorhynchus spp. {3}	**0.000**	0.239												
Meligethes aeneus {4}	**0.000**	**0.002**	0.986											
Oulema melanopus {5}	**0.000**	**0.019**	0.997	1.000										
other herbivores {6}	1.000	**0.000**	**0.006**	**0.039**	**0.036**									
Diptera {7}	**0.000**	**0.038**	1.000	1.000	1.000	**0.015**								
Aphodius sp. {8}	**0.000**	0.068	1.000	1.000	1.000	**0.026**	1.000							
other saprophages {9}	0.970	**0.000**	**0.000**	**0.003**	**0.003**	0.998	**0.001**	**0.002**						
Coleoptera {10}	**0.000**	0.913	0.999	0.377	0.716	**0.001**	0.899	0.896	**0.000**					
Hister sp. {11}	1.000	**0.000**	**0.000**	**0.002**	**0.002**	1.000	**0.000**	**0.001**	0.998	**0.000**				
Coccinella septempunctata {12}	**0.009**	1.000	1.000	1.000	1.000	**0.001**	1.000	1.000	**0.000**	1.000	**0.001**			
other predators {13}	1.000	**0.006**	0.068	0.182	0.176	1.000	0.111	0.148	1.000	**0.029**	1.000	**0.030**		
PARASITES {14}	0.976	**0.000**	**0.006**	**0.022**	**0.021**	0.998	**0.011**	**0.016**	1.000	**0.002**	0.998	**0.002**	1.000	
All other insects {15}	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.052	**0.000**	**0.000**

Table 7
Results of Spearman rank correlations (r_s) and associated *p*-values testing the relationship between the concentrations of 12 elements measured in oilseed rape plant samples (determined as the whole plant) and major functional invertebrate groupings or main taxonomic insect groups, and habitat variables of 34 oilseed rape fields in SW Poland in spring 2015. The relationships that meet the FDR-adjusted *P*-value are shown in red font; black font − $P \leq 0.05$; grey font − $P > 0.05$.

Correlation (pair of variables)	n	K		Na		Ca		Mg		Cu		Zn		Fe		Mn		As		Cd		Co		Pb	
		rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p	rs	p
Plant & Field area	34	-0.154	0.383	-0.101	0.571	-0.188	0.286	-0.040	0.824	0.122	0.493	-0.134	0.451	-0.020	0.909	-0.129	0.466	0.039	0.825	**-0.352**	**0.041**	0.218	0.215	0.090	0.613
Plant & %arable land	34	0.102	0.566	**-0.385**	**0.025**	**-0.355**	**0.039**	-0.290	0.096	**-0.408**	**0.016**	-0.077	0.663	-0.126	0.476	-0.121	0.495	0.006	0.973	-0.037	0.834	-0.245	0.163	-0.184	0.298
Plant & Arable land	34	0.102	0.566	**-0.385**	**0.025**	**-0.355**	**0.039**	-0.290	0.096	**-0.408**	**0.016**	-0.077	0.663	-0.126	0.476	-0.121	0.495	0.006	0.973	-0.037	0.834	-0.245	0.163	-0.184	0.298
Plant & Permanent vegetation	34	0.060	0.735	-0.105	0.553	0.033	0.855	0.132	0.456	0.037	0.834	0.034	0.848	0.072	0.685	0.265	0.129	-0.315	0.069	0.196	0.266	-0.247	0.159	0.108	0.542
Plant & Linear woody features (ha)	34	0.063	0.722	0.040	0.820	0.150	0.398	0.013	0.944	0.074	0.677	0.053	0.768	0.207	0.239	-0.110	0.534	0.224	0.203	-0.076	0.670	**0.472**	**0.005**	-0.163	0.356
Plant & Linear woody features (m)	34	0.296	0.090	0.003	0.988	0.133	0.455	-0.066	0.712	-0.022	0.900	-0.018	0.920	0.074	0.679	-0.046	0.796	0.084	0.637	0.065	0.715	0.218	0.216	-0.266	0.128
Plant & Dirt road (ha)	34	-0.050	0.778	0.075	0.675	-0.201	0.254	-0.002	0.993	0.286	0.101	-0.034	0.847	0.142	0.423	-0.241	0.170	0.016	0.928	**-0.462**	**0.006**	0.246	0.161	0.189	0.284
Plant & Dirt road (m)	34	-0.101	0.571	0.115	0.517	-0.124	0.485	0.038	0.832	**0.350**	**0.042**	0.056	0.754	0.239	0.174	-0.208	0.239	-0.079	0.655	**-0.525**	**0.001**	0.282	0.106	0.203	0.251
Plant & Asphalt road (ha)	34	0.089	0.617	-0.166	0.348	0.226	0.199	-0.095	0.593	-0.308	0.077	-0.114	0.520	-0.304	0.080	0.281	0.108	0.133	0.453	**0.515**	**0.002**	-0.244	0.164	-0.332	0.055
Plant & Asphalt road (m)	34	0.064	0.720	-0.126	0.477	0.241	0.170	-0.144	0.416	**-0.387**	**0.024**	-0.134	0.450	**-0.350**	**0.043**	0.232	0.187	0.072	0.684	**0.482**	**0.004**	-0.258	0.141	-0.332	0.055
Plant & Woodlot (ha)	34	-0.051	0.775	0.190	0.281	0.177	0.315	0.127	0.474	0.306	0.078	0.119	0.502	0.190	0.281	0.139	0.434	0.140	0.428	-0.205	0.245	0.106	0.549	0.223	0.205
Plant & Forest (ha)	34	-0.136	0.443	0.095	0.593	0.160	0.365	0.057	0.749	0.100	0.574	-0.010	0.954	-0.204	0.248	-0.020	0.910	-0.056	0.753	0.033	0.852	-0.034	0.849	-0.124	0.485
Plant & Wooded area (ha)	34	-0.158	0.371	0.219	0.214	0.211	0.230	0.090	0.612	0.241	0.169	0.057	0.750	-0.123	0.490	0.015	0.932	-0.016	0.930	-0.051	0.776	0.012	0.947	0.023	0.897
Aphodius & Field area	22	-0.076	0.736	-0.205	0.360	-0.080	0.725	0.078	0.728	-0.002	0.994	-0.224	0.316	-0.114	0.613	-0.030	0.895	-0.203	0.364	0.048	0.832	0.078	0.728	-0.098	0.663
Aphodius & %arable land	22	0.252	0.258	0.315	0.154	0.246	0.271	0.238	0.287	-0.285	0.198	**-0.425**	**0.049**	-0.025	0.913	0.261	0.241	-0.040	0.861	**0.552**	**0.008**	0.291	0.189	-0.133	0.554
Aphodius & Arable land	22	0.252	0.258	0.315	0.154	0.246	0.271	0.238	0.287	-0.285	0.198	**-0.425**	**0.049**	-0.025	0.913	0.261	0.241	-0.040	0.861	**0.552**	**0.008**	0.291	0.189	-0.133	0.554
Aphodius & Permanent vegetation	22	0.153	0.495	**0.474**	**0.026**	0.049	0.829	0.008	0.972	0.182	0.419	-0.103	0.648	0.092	0.683	0.037	0.871	0.033	0.883	0.161	0.475	-0.036	0.875	0.170	0.450
Aphodius & Linear woody features (ha)	22	-0.021	0.927	-0.091	0.687	0.002	0.994	-0.229	0.306	-0.157	0.486	-0.174	0.439	-0.417	0.054	0.239	0.285	-0.008	0.971	-0.216	0.333	-0.243	0.276	-0.021	0.927
Aphodius & Linear woody features (m)	22	-0.175	0.436	-0.196	0.381	-0.209	0.351	-0.403	0.063	-0.065	0.773	-0.076	0.735	-0.359	0.101	0.143	0.525	0.005	0.983	-0.265	0.233	-0.361	0.099	0.145	0.519
Aphodius & Dirt road (ha)	22	-0.168	0.455	-0.285	0.198	0.019	0.933	-0.112	0.620	-0.018	0.937	-0.038	0.865	-0.353	0.107	0.082	0.716	-0.286	0.196	-0.278	0.211	-0.305	0.168	-0.071	0.755
Aphodius & Dirt road (m)	22	-0.358	0.102	-0.312	0.158	-0.212	0.344	-0.284	0.200	0.158	0.483	0.104	0.646	-0.067	0.767	0.059	0.796	-0.229	0.305	**-0.482**	**0.023**	-0.387	0.075	0.198	0.377
Aphodius & Asphalt road (ha)	22	0.130	0.564	0.100	0.659	-0.178	0.428	0.138	0.540	-0.033	0.883	0.141	0.533	0.108	0.632	-0.150	0.506	0.323	0.143	0.200	0.371	0.226	0.311	0.025	0.913
Aphodius & Asphalt road (m)	22	0.171	0.447	0.178	0.428	-0.030	0.896	0.102	0.652	-0.031	0.892	0.102	0.652	0.127	0.572	-0.148	0.511	0.302	0.171	0.276	0.213	0.291	0.188	-0.028	0.902
Aphodius & Woodlot (ha)	22	-0.139	0.537	-0.300	0.175	-0.183	0.416	-0.029	0.897	0.166	0.462	0.201	0.369	0.060	0.792	-0.050	0.825	-0.050	0.825	-0.351	0.109	-0.097	0.666	-0.275	0.215
Aphodius & Forest (ha)	22	0.075	0.741	-0.064	0.778	0.012	0.959	0.175	0.437	0.095	0.675	0.304	0.169	0.247	0.268	-0.264	0.235	0.222	0.320	-0.104	0.646	0.090	0.691	0.102	0.653
Aphodius & Wooded area (ha)	22	-0.098	0.665	-0.267	0.230	-0.141	0.530	0.055	0.807	0.236	0.291	0.404	0.063	0.242	0.277	-0.252	0.258	0.113	0.617	-0.277	0.213	-0.014	0.949	-0.026	0.909
POLLINATOR & Field area	31	-0.008	0.967	0.060	0.747	0.277	0.131	**0.420**	**0.019**	0.253	0.170	-0.032	0.863	-0.214	0.247	0.298	0.103	-0.006	0.975	-0.149	0.423	0.213	0.250	**-0.380**	**0.035**
POLLINATOR & %arable land	31	0.190	0.306	0.240	0.194	**0.388**	**0.031**	0.197	0.289	-0.231	0.210	0.169	0.364	0.059	0.751	0.270	0.141	0.277	0.131	0.209	0.259	-0.200	0.281	0.117	0.531
POLLINATOR & Arable land	31	0.190	0.306	0.240	0.194	**0.388**	**0.031**	0.197	0.289	-0.231	0.210	0.169	0.364	0.059	0.751	0.270	0.141	0.277	0.131	0.209	0.259	-0.200	0.281	0.117	0.531
POLLINATOR & Permanent vegetation	31	0.011	0.952	0.093	0.620	**-0.390**	**0.030**	-0.324	0.076	-0.189	0.310	0.136	0.466	0.209	0.259	-0.046	0.807	-0.033	0.861	0.220	0.234	-0.106	0.569	0.325	0.074
POLLINATOR & Linear woody features (ha)	31	-0.139	0.456	-0.287	0.117	0.063	0.738	0.191	0.304	0.206	0.267	**-0.420**	**0.019**	-0.056	0.766	0.218	0.239	-0.143	0.443	0.034	0.854	0.189	0.309	-0.253	0.170
POLLINATOR & Linear woody features (m)	31	0.013	0.944	-0.162	0.383	0.075	0.690	0.269	0.143	-0.092	0.622	-0.221	0.231	0.023	0.904	**0.412**	**0.021**	-0.137	0.463	0.060	0.747	-0.026	0.891	-0.162	0.384
POLLINATOR & Dirt road (ha)	31	0.228	0.218	0.268	0.144	0.201	0.277	0.319	0.080	0.049	0.795	0.177	0.340	-0.014	0.940	0.295	0.107	0.084	0.654	0.098	0.601	0.052	0.783	-0.197	0.289
POLLINATOR & Dirt road (m)	31	0.218	0.238	0.280	0.127	0.174	0.348	0.239	0.196	-0.103	0.581	0.211	0.255	-0.049	0.795	**0.427**	**0.017**	0.088	0.637	0.202	0.275	-0.128	0.492	-0.012	0.949
POLLINATOR & Asphalt road (ha)	31	-0.029	0.876	-0.253	0.169	-0.111	0.553	0.010	0.956	0.058	0.757	-0.234	0.204	0.049	0.793	-0.209	0.260	-0.127	0.495	-0.266	0.148	0.106	0.570	-0.170	0.362
POLLINATOR & Asphalt road (m)	31	-0.109	0.559	-0.245	0.183	-0.153	0.412	-0.139	0.455	-0.071	0.706	-0.175	0.347	0.124	0.507	-0.217	0.241	-0.104	0.578	-0.254	0.168	0.003	0.986	0.015	0.936
POLLINATOR & Woodlot (ha)	31	0.112	0.549	0.210	0.257	-0.110	0.556	-0.035	0.853	-0.021	0.912	0.260	0.159	0.147	0.429	-0.131	0.483	0.016	0.932	0.091	0.628	0.044	0.816	-0.101	0.589
POLLINATOR & Forest (ha)	31	0.115	0.539	-0.261	0.157	-0.008	0.967	-0.046	0.808	0.319	0.081	-0.108	0.563	-0.159	0.394	-0.196	0.292	0.052	0.781	**-0.404**	**0.024**	0.157	0.400	-0.103	0.580
POLLINATOR & Wooded area (ha)	31	0.126	0.499	-0.132	0.479	-0.042	0.823	-0.074	0.693	0.250	0.174	0.003	0.986	-0.085	0.649	-0.209	0.259	0.004	0.982	-0.299	0.103	0.126	0.498	-0.118	0.527
Ceutorhynchus & Field area	30	-0.035	0.854	0.094	0.623	0.098	0.605	0.057	0.766	0.156	0.411	0.137	0.469	-0.011	0.954	-0.136	0.475	0.254	0.176	-0.136	0.474	0.213	0.259	0.161	0.396
Ceutorhynchus & %arable land	30	-0.036	0.852	0.052	0.786	0.099	0.602	0.028	0.884	0.089	0.639	0.041	0.831	0.125	0.510	0.039	0.838	-0.102	0.593	0.253	0.177	0.187	0.324	-0.019	0.921
Ceutorhynchus & Arable land	30	-0.036	0.852	0.052	0.786	0.099	0.602	0.028	0.884	0.089	0.639	0.041	0.831	0.125	0.510	0.039	0.838	-0.102	0.593	0.253	0.177	0.187	0.324	-0.019	0.921
Ceutorhynchus & Permanent vegetation	30	0.159	0.401	0.127	0.505	0.098	0.605	-0.036	0.850	-0.011	0.952	0.043	0.821	0.076	0.691	-0.079	0.677	-0.133	0.484	0.259	0.168	-0.187	0.322	0.003	0.989
Ceutorhynchus & Linear woody features (ha)	30	0.088	0.643	0.098	0.606	0.090	0.638	0.185	0.329	0.163	0.388	-0.064	0.737	0.139	0.464	-0.123	0.518	-0.171	0.367	0.179	0.345	0.079	0.679	0.148	0.436
Ceutorhynchus & Linear woody features (m)	30	-0.029	0.877	-0.048	0.802	-0.141	0.458	-0.017	0.928	0.322	0.082	-0.244	0.194	-0.065	0.735	0.065	0.731	-0.162	0.392	0.129	0.496	-0.004	0.983	0.060	0.752
Ceutorhynchus & Dirt road (ha)	30	-0.282	0.131	-0.187	0.323	-0.218	0.247	-0.143	0.451	0.320	0.085	-0.202	0.285	-0.169	0.371	0.164	0.385	0.191	0.312	-0.236	0.210	0.018	0.925	-0.018	0.923
Ceutorhynchus & Dirt road (m)	30	-0.256	0.172	-0.232	0.217	-0.273	0.144	-0.209	0.267	0.258	0.169	-0.252	0.179	-0.326	0.079	0.235	0.211	0.274	0.143	-0.183	0.334	-0.034	0.858	-0.079	0.679
Ceutorhynchus & Asphalt road (ha)	30	0.102	0.592	0.055	0.773	0.081	0.672	0.029	0.878	-0.088	0.645	0.092	0.629	0.065	0.734	-0.072	0.705	-0.073	0.701	0.030	0.874	-0.016	0.933	0.010	0.958
Ceutorhynchus & Asphalt road (m)	30	0.178	0.346	0.141	0.456	0.163	0.390	0.163	0.390	-0.162	0.393	0.175	0.354	0.190	0.315	-0.170	0.369	-0.090	0.637	0.069	0.717	-0.048	0.802	0.037	0.845
Ceutorhynchus & Woodlot (ha)	30	-0.224	0.234	-0.192	0.309	-0.112	0.555	-0.283	0.130	0.017	0.931	-0.151	0.427	-0.206	0.274	0.279	0.135	0.111	0.561	-0.198	0.295	0.139	0.464	-0.278	0.136
Ceutorhynchus & Forest (ha)	30	-0.047	0.807	-0.108	0.571	-0.161	0.396	0.000	0.999	-0.195	0.301	0.007	0.971	-0.218	0.247	0.012	0.951	0.257	0.171	-0.334	0.071	-0.229	0.224	0.034	0.859
Ceutorhynchus & Wooded area (ha)	30	-0.129	0.498	-0.174	0.359	-0.178	0.346	-0.115	0.544	-0.155	0.414	-0.040	0.834	-0.260	0.165	0.136	0.473	0.271	0.147	**-0.374**	**0.041**	-0.170	0.369	-0.075	0.695
Coccinella & Field area	4			-0.600	0.400	0.400	0.600	-0.211	0.789	0.200	0.800	-0.800	0.200	0.800	0.200	0.400	0.600	0.200	0.800	0.600	0.400	-0.400	0.600	0.800	0.200
Coccinella & %arable land	4	-0.400	0.600	-0.800	0.200	-0.200	0.800	0.105	0.895	-0.400	0.600	-0.600	0.400					0.400	0.600	0.800	0.200				
Coccinella & Arable land	4	-0.400	0.600	-0.800	0.200	-0.200	0.800	0.105	0.895	-0.400	0.600	-0.600	0.400					0.400	0.600	0.800	0.200				

Coccinella & Permanent vegetation	4	-0.738	0.262	-0.211	0.789	-0.738	0.262	0.889	0.111	-0.211	0.789	0.105	0.895	-0.316	0.684	0.105	0.895	-0.632	0.368	0.211	0.789	-0.105	0.895	-0.316	0.684
Coccinella & Linear woody features (ha)	4	-0.949	0.051	-0.632	0.368	-0.949	0.051	0.889	0.111	-0.632	0.368	-0.105	0.895	0.316	0.684	-0.105	0.895	-0.211	0.789	0.632	0.368	0.105	0.895	0.316	0.684
Coccinella & Linear woody features (m)	4	-0.949	0.051	-0.632	0.368	-0.949	0.051	0.889	0.111	-0.632	0.368	-0.105	0.895	0.316	0.684	-0.105	0.895	-0.211	0.789	0.632	0.368	0.105	0.895	0.316	0.684
Coccinella & Dirt road (ha)	4	0.600	0.400	0.000	1.000	0.800	0.200	-0.738	0.262	0.400	0.600	-0.400	0.600	0.400	0.600	0.200	0.800	0.400	0.600	0.000	1.000	-0.200	0.800	0.400	0.600
Coccinella & Dirt road (m)	4	0.600	0.400	0.000	1.000	0.800	0.200	-0.738	0.262	0.400	0.600	-0.400	0.600	0.400	0.600	0.200	0.800	0.400	0.600	0.000	1.000	-0.200	0.800	0.400	0.600
Coccinella & Asphalt road (ha)	4	-0.738	0.262	-0.211	0.789	-0.738	0.262	0.889	0.111	-0.211	0.789	0.105	0.895	-0.316	0.684	0.105	0.895	-0.632	0.368	0.211	0.789	-0.105	0.895	-0.316	0.684
Coccinella & Asphalt road (m)	4	-0.738	0.262	-0.211	0.789	-0.738	0.262	0.889	0.111	-0.211	0.789	0.105	0.895	-0.316	0.684	0.105	0.895	-0.632	0.368	0.211	0.789	-0.105	0.895	-0.316	0.684
Coccinella & Woodlot (ha)	4	0.258	0.742	-0.258	0.742	0.775	0.225	-0.272	0.728	0.775	0.225	-0.775	0.225	0.258	0.742	0.775	0.225	-0.258	0.742	0.258	0.742	-0.775	0.225	0.258	0.742
Coccinella & Forest (ha)	4	0.632	0.368	0.949	0.051	0.105	0.895	-0.500	0.500	-0.105	0.895	0.949	0.051	-0.738	0.262	-0.632	0.368	0.316	0.684	-0.949	0.051	0.632	0.368	-0.738	0.262
Coccinella & Wooded area (ha)	4	0.800	0.200			0.400	0.600	-0.632	0.368	0.200	0.800	0.800	0.200	-0.800	0.200	-0.400	0.600	0.200	0.800			0.400	0.600	-0.800	0.200
Coleoptera & Field area	34	0.187	0.290	-0.248	0.157	0.130	0.465	-0.099	0.577	-0.261	0.136	-0.250	0.154	-0.334	0.054	-0.009	0.960	-0.207	0.240	-0.053	0.766	0.053	0.764	-0.072	0.685
Coleoptera & %arable land	34	0.273	0.119	-0.005	0.976	0.128	0.472	0.037	0.838	-0.198	0.260	-0.082	0.646	-0.062	0.726	0.123	0.488	0.101	0.570	-0.226	0.198	0.034	0.848	-0.055	0.759
Coleoptera & Arable land	34	0.273	0.119	-0.005	0.976	0.128	0.472	0.037	0.838	-0.198	0.260	-0.082	0.646	-0.062	0.726	0.123	0.488	0.101	0.570	-0.226	0.198	0.034	0.848	-0.055	0.759
Coleoptera & Permanent vegetation	34	-0.112	0.527	-0.006	0.971	-0.305	0.080	-0.152	0.390	-0.004	0.982	0.077	0.665	0.179	0.311	-0.186	0.293	**0.453**	**0.007**	0.142	0.423	-0.169	0.338	-0.143	0.419
Coleoptera & Linear woody features (ha)	34	0.062	0.726	0.120	0.498	0.290	0.096	**0.430**	**0.011**	0.105	0.556	0.000	0.998	0.204	0.247	**0.356**	**0.039**	-0.254	0.148	-0.009	0.960	0.102	0.565	0.108	0.544
Coleoptera & Linear woody features (m)	34	0.273	0.118	0.150	0.399	0.284	0.103	**0.487**	**0.003**	0.011	0.950	0.108	**0.542**	**0.348**	**0.044**	**0.436**	**0.010**	-0.146	0.409	0.061	0.734	0.192	0.276	0.219	0.213
Coleoptera & Dirt road (ha)	34	0.078	0.660	0.014	0.937	-0.109	0.538	-0.063	0.722	-0.229	0.192	-0.159	0.368	-0.196	0.267	0.094	0.598	**-0.390**	**0.022**	-0.219	0.214	0.186	0.292	0.162	0.361
Coleoptera & Dirt road (m)	34	0.106	0.553	0.053	0.767	-0.046	0.796	0.011	0.953	-0.208	0.238	-0.059	0.740	-0.182	0.304	0.136	0.444	**-0.452**	**0.007**	-0.189	0.284	0.208	0.237	0.266	0.128
Coleoptera & Asphalt road (ha)	34	0.110	0.534	-0.091	0.609	-0.062	0.729	0.051	0.773	0.137	0.439	0.003	0.987	0.195	0.270	-0.107	0.547	**0.439**	**0.009**	**0.398**	**0.020**	-0.172	0.331	-0.143	0.419
Coleoptera & Asphalt road (m)	34	0.036	0.840	-0.107	0.545	0.018	0.919	0.049	0.783	0.253	0.148	0.007	0.967	0.215	0.223	-0.098	0.581	**0.523**	**0.001**	**0.339**	**0.050**	-0.122	0.491	-0.046	0.796
Coleoptera & Woodlot (ha)	34	-0.101	0.569	0.125	0.482	-0.267	0.127	-0.179	0.312	0.042	0.813	-0.126	0.476	-0.230	0.191	-0.252	0.150	-0.083	0.642	0.040	0.822	-0.159	0.370	-0.018	0.918
Coleoptera & Forest (ha)	34	-0.136	0.442	-0.203	0.249	-0.128	0.471	-0.182	0.303	0.014	0.939	0.158	0.372	-0.128	0.469	-0.181	0.306	-0.107	0.548	0.169	0.340	-0.099	0.576	-0.065	0.715
Coleoptera & Wooded area (ha)	34	-0.128	0.470	-0.158	0.371	-0.231	0.189	-0.241	`	0.015	0.935	0.037	0.836	-0.248	0.158	-0.292	0.094	-0.124	0.486	0.156	0.377	-0.146	0.410	-0.024	0.891
Diptera & Field area	34	-0.045	0.799	0.276	0.114	0.281	0.108	**0.445**	**0.008**	**-0.499**	**0.003**	-0.015	0.934	-0.117	0.510	0.095	0.593	0.257	0.142	0.335	0.053	-0.176	0.321	-0.214	0.223
Diptera & %arable land	34	0.016	0.930	0.053	0.767	0.102	0.567	0.192	0.277	-0.259	0.139	-0.276	0.114	0.008	0.964	-0.193	0.273	0.137	0.441	0.135	0.448	-0.174	0.325	-0.162	0.360
Diptera & Arable land	34	0.016	0.930	0.053	0.767	0.102	0.567	0.192	0.277	-0.259	0.139	-0.276	0.114	0.008	0.964	-0.193	0.273	0.137	0.441	0.135	0.448	-0.174	0.325	-0.162	0.360
Diptera & Permanent vegetation	34	0.014	0.939	-0.031	0.860	-0.033	0.851	-0.069	0.697	-0.037	0.833	0.114	0.521	-0.136	0.443	-0.037	0.836	-0.115	0.519	0.012	0.948	0.088	0.622	0.118	0.508
Diptera & Linear woody features (ha)	34	-0.112	0.527	0.156	0.378	0.085	0.634	0.125	0.481	-0.004	0.981	-0.059	0.738	-0.089	0.615	-0.111	0.532	0.185	0.294	-0.087	0.623	-0.259	0.139	-0.214	0.225
Diptera & Linear woody features (m)	34	-0.011	0.952	0.178	0.315	0.227	0.197	0.220	0.211	-0.085	0.631	0.046	0.795	-0.199	0.260	-0.097	0.585	0.112	0.528	0.186	0.291	-0.291	0.095	-0.233	0.185
Diptera & Dirt road (ha)	34	-0.070	0.696	0.287	0.100	0.153	0.389	0.317	0.067	-0.268	0.126	0.150	0.397	-0.052	0.770	0.134	0.451	0.223	0.204	0.099	0.579	**-0.341**	**0.049**	-0.293	0.093
Diptera & Dirt road (m)	34	-0.109	0.541	0.213	0.226	0.099	0.578	0.224	0.203	-0.272	0.120	0.129	0.467	-0.114	0.521	0.009	0.960	0.270	0.122	0.194	0.273	-0.295	0.091	-0.202	0.252
Diptera & Asphalt road (ha)	34	0.146	0.409	-0.215	0.221	0.004	0.982	-0.076	0.669	0.189	0.285	0.139	0.432	-0.135	0.445	0.021	0.908	-0.283	0.105	0.081	0.648	0.241	0.169	0.189	0.285
Diptera & Asphalt road (m)	34	0.158	0.371	-0.127	0.474	0.076	0.669	-0.064	0.720	0.179	0.312	-0.011	0.949	0.011	0.952	-0.118	0.508	-0.291	0.095	-0.076	0.669	0.106	0.552	0.063	0.722
Diptera & Woodlot (ha)	34	0.216	0.220	-0.195	0.268	-0.301	0.084	-0.116	0.514	0.158	0.372	0.163	0.356	0.123	0.490	0.102	0.565	-0.005	0.976	-0.084	0.636	0.019	0.917	0.040	0.821
Diptera & Forest (ha)	34	0.075	0.675	0.065	0.717	0.056	0.752	-0.128	0.472	0.055	0.755	0.246	0.162	-0.167	0.346	0.100	0.573	-0.289	0.097	-0.019	0.916	0.179	0.312	0.108	0.544
Diptera & Wooded area (ha)	34	0.177	0.316	-0.024	0.891	-0.098	0.581	-0.139	0.432	0.108	0.544	0.285	0.102	-0.055	0.759	0.116	0.512	-0.274	0.116	-0.051	0.773	0.141	0.425	0.097	0.586
Hister & Field area	6	0.543	0.266	0.029	0.957	-0.600	0.208	-0.429	0.397	0.657	0.156	-0.314	0.544	-0.086	0.872	-0.371	0.468	0.771	0.072	0.371	0.468	-0.257	0.623	0.714	0.111
Hister & %arable land	6	-0.371	0.468	0.771	0.072	-0.314	0.544	-0.714	0.111	0.771	0.072	-0.486	0.329	**-0.829**	**0.042**	-0.086	0.872	0.257	0.623	-0.371	0.468	-0.371	0.468	0.486	0.329
Hister & Arable land	6	-0.371	0.468	0.771	0.072	-0.314	0.544	-0.714	0.111	0.771	0.072	-0.486	0.329	**-0.829**	**0.042**	-0.086	0.872	0.257	0.623	-0.371	0.468	-0.371	0.468	0.486	0.329
Hister & Permanent vegetation	6	0.143	0.787	0.257	0.623	-0.657	0.156	-0.657	0.156	0.143	0.787	0.086	0.872	-0.029	0.957	-0.200	0.704	-0.543	0.266	-0.257	0.623	0.657	0.156	0.314	0.544
Hister & Linear woody features (ha)	6	0.030	0.954	-0.577	0.231	0.698	0.123	**0.880**	**0.021**	-0.516	0.295	0.152	0.774	0.395	0.439	0.213	0.686	0.273	0.600	0.334	0.518	-0.334	0.518	-0.516	0.295
Hister & Linear woody features (m)	6	0.030	0.954	-0.577	0.231	0.698	0.123	**0.880**	**0.021**	-0.516	0.295	0.152	0.774	0.395	0.439	0.213	0.686	0.273	0.600	0.334	0.518	-0.334	0.518	-0.516	0.295
Hister & Dirt road (ha)	6	-0.068	0.899	0.778	0.069	-0.169	0.749	-0.507	0.305	0.676	0.140	0.439	0.383	0.101	0.848	-0.034	0.949	0.034	0.949	0.507	0.305	-0.135	0.798	0.338	0.512
Hister & Dirt road (m)	6	-0.068	0.899	0.778	0.069	-0.169	0.749	-0.507	0.305	0.676	0.140	0.439	0.383	0.101	0.848	-0.034	0.949	0.034	0.949	0.507	0.305	-0.135	0.798	0.338	0.512
Hister & Asphalt road (ha)	6	0.200	0.704	**-0.886**	**0.019**	0.314	0.544	0.714	0.111	-0.600	0.208	-0.314	0.544	0.143	0.787	0.086	0.872	0.314	0.544	-0.086	0.872	-0.143	0.787	-0.314	0.544
Hister & Asphalt road (m)	6	0.086	0.872	**-0.943**	**0.005**	0.371	0.468	0.771	0.072	-0.771	0.072	-0.200	0.704	0.257	0.623	0.257	0.623	0.086	0.872	-0.143	0.787	-0.029	0.957	-0.429	0.397
Hister & Forest (ha)	6	0.698	0.123	-0.638	0.173	0.152	0.774	0.577	0.231	-0.395	0.439	0.516	0.295	**0.880**	**0.021**	-0.213	0.686	0.152	0.774	0.759	0.080	0.213	0.686	-0.213	0.686
Hister & Wooded area (ha)	6	0.698	0.123	-0.638	0.173	0.152	0.774	0.577	0.231	-0.395	0.439	0.516	0.295	**0.880**	**0.021**	-0.213	0.686	0.152	0.774	0.759	0.080	0.213	0.686	-0.213	0.686
Meligethes & Field area	34	-0.006	0.975	-0.098	0.580	-0.137	0.439	-0.082	0.643	-0.048	0.787	0.081	0.647	-0.140	0.428	0.020	0.912	0.291	0.095	0.115	0.518	0.047	0.791	-0.111	0.533
Meligethes & %arable land	34	-0.133	0.455	-0.121	0.495	0.257	0.143	-0.094	0.597	0.010	0.957	-0.206	0.241	0.167	0.344	0.026	0.886	0.188	0.288	0.009	0.960	0.049	0.785	-0.105	0.553
Meligethes & Arable land	34	-0.133	0.455	-0.121	0.495	0.257	0.143	-0.094	0.597	0.010	0.957	-0.206	0.241	0.167	0.344	0.026	0.886	0.188	0.288	0.009	0.960	0.049	0.785	-0.105	0.553
Meligethes & Permanent vegetation	34	-0.332	0.055	-0.304	0.081	-0.275	0.116	-0.245	0.163	0.322	0.063	-0.259	0.140	-0.087	0.624	0.075	0.674	-0.167	0.345	-0.074	0.678	0.106	0.549	-0.043	0.807
Meligethes & Linear woody features (ha)	34	0.294	0.091	0.275	0.115	0.297	0.088	0.262	0.134	**-0.398**	**0.020**	0.307	0.077	-0.056	0.754	0.024	0.894	0.092	0.603	-0.203	0.251	-0.111	0.533	0.178	0.313
Meligethes & Linear woody features (m)	34	**0.499**	**0.003**	**0.352**	**0.041**	**0.372**	**0.030**	**0.379**	**0.027**	-0.301	0.084	**0.341**	**0.048**	-0.011	0.949	0.126	0.476	0.129	0.469	-0.235	0.182	-0.153	0.386	0.067	0.707
Meligethes & Dirt road (ha)	34	0.076	0.669	-0.004	0.983	-0.202	0.252	0.020	0.909	0.032	0.859	-0.079	0.657	-0.056	0.753	0.205	0.244	0.111	0.534	0.187	0.289	0.150	0.396	-0.203	0.249
Meligethes & Dirt road (m)	34	0.095	0.594	0.039	0.825	-0.093	0.600	0.122	0.492	-0.093	0.602	0.011	0.951	-0.047	0.792	0.161	0.364	0.075	0.675	0.180	0.308	0.084	0.636	-0.086	0.630
Meligethes & Asphalt road (ha)	34	0.043	0.809	0.033	0.852	0.024	0.891	-0.153	0.387	0.148	0.403	0.072	0.684	-0.018	0.918	-0.208	0.238	-0.016	0.927	-0.066	0.709	-0.033	0.851	-0.057	0.747
Meligethes & Asphalt road (m)	34	-0.039	0.828	-0.012	0.945	0.068	0.703	-0.119	0.504	0.076	0.670	-0.012	0.947	0.131	0.460	-0.124	0.485	-0.004	0.981	0.002	0.990	0.002	0.990	-0.005	0.978
Meligethes & Woodlot (ha)	34	-0.114	0.521	-0.055	0.757	-0.270	0.123	-0.189	0.283	0.111	0.532	-0.052	0.770	-0.109	0.539	-0.244	0.164	0.042	0.816	0.300	0.084	0.055	0.757	0.008	0.963
Meligethes & Forest (ha)	34	0.062	0.729	0.150	0.397	-0.250	0.155	-0.100	0.574	-0.001	0.995	0.109	0.539	0.080	0.652	0.058	0.746	0.048	0.789	0.049	0.782	0.136	0.442	-0.103	0.562
Meligethes & Wooded area (ha)	34	0.018	0.919	0.086	0.629	-0.333	0.054	-0.157	0.375	0.012	0.945	0.101	0.569	0.005	0.976	-0.041	0.818	0.051	0.773	0.174	0.324	0.149	0.401	-0.068	0.704

(*continued on next page*)

Table 7 (*continued*)

All other insects & Field area	34	-0.029	0.869	-0.121	0.494	-0.150	0.396	-0.132	0.455	0.208	0.237	0.172	0.330	-0.035	0.843	-0.040	0.824	**-0.423**	**0.013**	-0.117	0.511	0.294	0.092	-0.057	0.749
All other insects & %arable land	34	-0.267	0.127	0.102	0.565	-0.095	0.592	-0.103	0.562	-0.004	0.983	-0.271	0.122	-0.189	0.285	-0.217	0.219	-0.132	0.455	0.006	0.975	-0.024	0.895	-0.074	0.678
All other insects & Arable land	34	-0.267	0.127	0.102	0.565	-0.095	0.592	-0.103	0.562	-0.004	0.983	-0.271	0.122	-0.189	0.285	-0.217	0.219	-0.132	0.455	0.006	0.975	-0.024	0.895	-0.074	0.678
All other insects & Permanent vegetation	34	-0.078	0.660	0.172	0.332	0.233	0.184	0.203	0.248	-0.116	0.515	0.111	0.532	-0.249	0.155	0.010	0.953	0.147	0.407	0.191	0.279	-0.173	0.327	-0.115	0.517
All other insects & Linear woody features (ha)	34	0.023	0.897	**-0.379**	**0.027**	-0.203	0.251	0.000	0.999	0.073	0.682	-0.204	0.247	0.207	0.241	-0.088	0.619	0.000	0.999	0.071	0.692	0.256	0.143	0.002	0.991
All other insects & Linear woody features (m)	34	-0.043	0.811	-0.216	0.220	-0.178	0.313	-0.063	0.722	0.031	0.860	-0.052	0.771	0.027	0.880	-0.147	0.407	0.005	0.976	0.016	0.927	0.275	0.115	-0.130	0.463
All other insects & Dirt road (ha)	34	0.048	0.786	**-0.475**	**0.005**	**-0.547**	**0.001**	-0.266	0.128	**0.343**	**0.047**	0.034	0.848	0.115	0.517	**-0.429**	**0.011**	**-0.415**	**0.015**	**-0.517**	**0.002**	**0.477**	**0.004**	0.122	0.490
All other insects & Dirt road (m)	34	0.122	0.490	**-0.473**	**0.005**	**-0.560**	**0.001**	-0.142	0.423	**0.389**	**0.023**	0.033	0.852	-0.006	0.975	**-0.431**	**0.011**	-0.293	0.093	**-0.462**	**0.006**	**0.545**	**0.001**	0.025	0.890
All other insects & Asphalt road (ha)	34	-0.148	0.402	**0.506**	**0.002**	**0.464**	**0.006**	0.183	0.300	-0.336	0.052	0.317	0.068	-0.119	0.502	**0.518**	**0.002**	0.179	0.310	0.299	0.086	**-0.395**	**0.021**	-0.027	0.878
All other insects & Asphalt road (m)	34	-0.096	0.587	**0.472**	**0.005**	**0.386**	**0.024**	0.145	0.414	-0.320	0.065	0.195	0.269	-0.159	0.368	**0.416**	**0.014**	0.296	0.089	0.317	0.068	**-0.346**	**0.045**	-0.024	0.893
All other insects & Woodlot (ha)	34	0.037	0.837	0.260	0.138	0.178	0.313	0.206	0.243	-0.186	0.292	0.150	0.397	0.232	0.187	**0.397**	**0.020**	-0.118	0.506	0.089	0.616	-0.131	0.460	0.328	0.058
All other insects & Forest (ha)	34	0.204	0.248	-0.062	0.727	-0.208	0.238	-0.123	0.488	0.147	0.407	**0.382**	**0.026**	0.096	0.588	0.022	0.904	-0.043	0.808	-0.305	0.079	0.102	0.566	0.007	0.970
All other insects & Wooded area (ha)	34	0.203	0.250	0.047	0.792	-0.102	0.564	-0.054	0.762	0.059	0.739	**0.408**	**0.017**	0.197	0.263	0.202	0.252	-0.075	0.674	-0.238	0.175	0.065	0.716	0.163	0.357
Oulema & Field area	23	0.309	0.151	0.148	0.501	-0.011	0.961	-0.069	0.754	-0.316	0.142	-0.230	0.291	-0.289	0.182	0.099	0.654	-0.175	0.425	0.140	0.523	-0.094	0.668	0.166	0.449
Oulema & %arable land	23	0.184	0.401	**0.453**	**0.030**	0.301	0.162	0.008	0.971	-0.060	0.785	-0.231	0.288	-0.160	0.466	0.289	0.182	0.030	0.893	0.404	0.056	0.258	0.235	-0.196	0.369
Oulema & Arable land	23	0.184	0.401	**0.453**	**0.030**	0.301	0.162	0.008	0.971	-0.060	0.785	-0.231	0.288	-0.160	0.466	0.289	0.182	0.030	0.893	0.404	0.056	0.258	0.235	-0.196	0.369
Oulema & Permanent vegetation	23	-0.057	0.798	0.040	0.855	-0.032	0.885	-0.175	0.423	0.215	0.325	0.100	0.649	0.191	0.382	-0.091	0.679	0.234	0.283	0.092	0.677	0.252	0.246	-0.254	0.243
Oulema & Linear woody features (ha)	23	0.017	0.939	0.308	0.153	0.153	0.486	0.049	0.825	-0.086	0.695	-0.134	0.542	-0.193	0.378	0.124	0.573	-0.174	0.426	-0.159	0.469	0.124	0.574	-0.059	0.790
Oulema & Linear woody features (m)	23	0.151	0.492	0.331	0.123	0.257	0.236	0.140	0.524	-0.124	0.573	-0.062	0.780	-0.143	0.515	0.112	0.610	-0.078	0.724	-0.112	0.610	0.202	0.356	-0.086	0.696
Oulema & Dirt road (ha)	23	0.330	0.124	0.101	0.645	0.185	0.397	0.259	0.233	-0.282	0.192	-0.162	0.460	-0.185	0.397	0.161	0.463	-0.301	0.163	0.030	0.894	0.007	0.976	-0.088	0.688
Oulema & Dirt road (m)	23	**0.449**	**0.031**	0.179	0.413	0.213	0.329	0.203	0.354	-0.274	0.206	-0.224	0.304	-0.082	0.712	0.145	0.510	-0.340	0.112	0.086	0.698	0.075	0.734	-0.032	0.884
Oulema & Asphalt road (ha)	23	-0.226	0.300	-0.044	0.840	-0.050	0.820	-0.127	0.565	-0.083	0.708	-0.047	0.831	-0.162	0.460	-0.165	0.451	**0.433**	**0.039**	0.038	0.864	0.094	0.671	0.037	0.868
Oulema & Asphalt road (m)	23	-0.262	0.228	-0.076	0.729	-0.057	0.798	-0.119	0.588	0.147	0.505	0.108	0.624	0.072	0.743	-0.150	0.495	**0.454**	**0.029**	-0.063	0.776	0.038	0.863	0.051	0.817
Oulema & Woodlot (ha)	23	0.100	0.651	-0.168	0.444	0.100	0.651	-0.096	0.662	-0.109	0.621	-0.169	0.441	-0.024	0.912	0.143	0.514	0.275	0.204	0.329	0.125	0.257	0.236	0.040	0.857
Oulema & Forest (ha)	23	0.052	0.814	-0.292	0.176	-0.127	0.563	0.241	0.268	-0.236	0.278	0.237	0.275	-0.131	0.552	-0.245	0.260	-0.338	0.115	-0.363	0.088	-0.294	0.173	0.201	0.357
Oulema & Wooded area (ha)	23	0.070	0.752	-0.362	0.090	-0.093	0.674	0.182	0.405	-0.213	0.328	0.150	0.495	-0.070	0.750	-0.165	0.452	-0.139	0.528	-0.182	0.406	-0.145	0.508	0.134	0.543

and use of agrochemicals were similar in all the other fields. The fields were sown (winter oilseed rape cultivar: PRW 31 F-1) in the second half of September 2014. Each of three mineral fertilisers (Polifoska G, Saletrosan 26% N, ammonium sulphate 34% N) was used in a dose of 300 kg ha^{-1}; foliar fertiliser (OSD Bor, 1.5 kg ha^{-1}) and magnesium sulphate (3 kg ha^{-1}). Also applied were herbicides (Butisan Star Max; 2.5 L ha^{-1}); insecticides between March and May (Ammo Super, Decis, Alfacet, Mospilan; each 0.1–0.15 L ha^{-1}) targeting herbivorous insects, mostly stem weevils *Ceutorhynchus* spp. and pollen beetles *Meligethes* spp.; and fungicides (Caryx, 0.6 L ha^{-1}; Pictor; 0.5 L ha^{-1}).

2.2. Chemical analysis

We used reference materials for each of the AAS measurements. These were blind tests, i.e. they contained the same chemical composition as a particular sample, but were devoid of the analysed biological material. The analytical procedure for preparing these samples was the same as in the case of our ones. We used standardised samples obtained from SGAB Analytica, Luleå Technical University, Luleå, Sweden and Fürst Medical Laboratory, Billingstad, Oslo, Norway, Certified Values and Uncertainty NCS ZC, i.e. standards of a particular quality for each kind of tissue and chemical element. The analytical measurement process was validated using reference materials, i.e. CVU (bovine liver, kidney, muscles, lung, bone) provided by SGAB Analytica, Luleå Technical University, Luleå, Sweden and Fürst Medical Laboratory, Billingstad, Oslo, Norway, Certified Values and Uncertainty NCS ZC. Reference values amounted to 0.25 ± 0.05–32.7 ± 1.8 for the target chemical elements. The average (±SD) values determined for the target elements (20 measurements in the invertebrate and plant samples) were 0.19 ± 0.05–34.8 ± 1.07. The precision of the method, understood as the degree of conformity between the results of multiple analyses performed on the same sample, was 5% (relative standard deviation, RSD).

2.3. Data treatment

Pre-analysis of our habitat variables quantified for the individual oilseed rape fields showed strong collinear associations (tested by Spearman's and Pearson's correlation coefficients) between some of these variables. Principal Component Analysis (PCA) was applied to reduce collinearity among them (see Table 2). But because PCA outputs identified PC-axes that clustered structurally distinct variables

(e.g. dirt and tarred roads or coverage of arable land and forest; Table 2), for which we wanted to assess their individual influence on particular invertebrate groups, the PCA-derived variables were of limited use in our subsequent analyses. Further, because the habitat variables were generally only loosely related to abundance data and the elemental traits of the studied organisms (and only single such relationships met the threshold of statistical significance), we assumed that the results of a univariate analysis (with *P*-values adjusted to multiple comparisons) would be justified, thus permitting a robust biological interpretation of our observations.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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